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# Review of Chinese species of the subfamily Leiodinae (Coleoptera: Leiodidae)

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## Taxonomy, descriptions, key, Coleoptera, Leiodidae, China

**Abstract.** *Anisotoma krati*, *nigra*, *becvari*, *dundae*, *schneideri* spp. n., *Cyrtoplastus chinensis* sp. n., *Stetholiodes turnai*, *chinense* spp. n., *Agathidium dundae*, *kepvali*, *becvari*, *uliginosum*, *yunnanicum*, *melanarium* spp. n., *alatum*, *heishuiense* spp. n., *Leiodes snizeki*, *alexandrae*, *becvari*, *curvidens*, *chinensis*, *juroslavi*, *xinjiangensis* spp. n., *Coleletisia sumilata* spp. n. from China are described and distinguished from the all related species. The genera *Anisotoma* Panzer, *Stetholiodes* Fall and *Coleletisia* Fauvel are recorded from China for the first time as well as *Anisotoma curia* (Portevin), *Leiodes lucens* (Fauvel) and *Pseudocoleus bouvieri* (Portevin). All 40 known Chinese species of the subfamily Leiodinae are keyed.

Knowledge of Chinese leioid fauna is poor. Records concerning to the species of the subfamily Leiodinae were given or summarized by Hetschko (1930), Hlismkovský (1964), Angelini & De Marzo (1983, 1984, 1988), Daffner (1983, 1988), Perkovsky (1991) and Švec (1991). Thirteen species of the six genera were known from China till now.

Through the kindness of Dr David Král, Mr Jan Schneider, Mr Radek Dundá, Ing Zbyněk Kejval, Ing Jaroslav Turna, Ing Stanislav Bečvář, Ing Miroslav Snížek we had a possibility to examine an interesting material of the subfamily Leiodinae collected in China during several last years.

Altogether 165 specimens belonging to 30 species were examined. Twenty three of them new to science are described below. Three species are added to Chinese fauna newly. Detailed faunistic data are given in the species examined.

Taxonomy of the subfamily is used according to Newton (1992) and Perkovsky (1991). Type of mesosternum in the genus *Leiodes* is indicated according to Daffner (1983).

## Tribe AGATHIDIINI

Twenty species of the four genera are known from China. The key is given below:

- |   |   |                               |
|---|---|-------------------------------|
| 1 | Antennal club 5-segmented (Figs 1, 2), clypeus protuberant (Figs 3, 4), postocular carina absent - <i>Anisotoma</i>   | 2                             |
| - | Antennal club 3-segmented (Figs 20, 27, 28, 37)   | 7                             |
| 2 | Elytra with 9 complete punctured rows   | 3                             |
| - | Elytra with 8 complete punctured rows, the 9th one confluent with lateral channel   | 5                             |
| 3 | Head sinuate only on clypeus. Dorsum black, antennae testaceous with black club, head and pronotum with well impressed puncturation, ratio of 3rd/2nd antennal segments = 1.5 (Fig. 1). Length 3.5 mm. Yunnan | <i>Anisotoma krati</i> sp. n. |
| - | Head without macro-sculpture  | 4                             |

- 4 Length 3.9 mm, antennae with antennal segments 7-11 black, intervals of punctured rows thickly punctured, ratio of 3rd/2nd antennal segments = 1.2 (Fig. 2) Dorsum black, head and pronotum with clear puncturation. Yunnan *A. nigra* sp. n.
- Length 2.6-3.0 mm, antennae with antennal segments 9-11 black, intervals of punctured rows scatteringly punctured, ratio of 3rd/2nd antennal segments = 1.5 (Fig. 10) Dorsum black, puncturation clear on head, sparse on pronotum. Yunnan *A. beccarii* sp. n.
- 5 Head striolate, black. Pronotum and elytra dark reddish brown, antennae testaceous with black club. Dorsum of head and pronotum striolate, puncturation sparse and superficial, ratio of 3rd/2nd antennal segments = 1.0 (Fig. 11) Length 2.7 mm. Sichuan *A. dundai* sp. n.
- Head without micro sculpture 6
- 6 Length 3.7 mm, whole dorsum black. Japan, Sichuan *A. curta*
- Length 4.2-4.3 mm, head and elytra black, pronotum reddish. Antennae testaceous with black club, whole dorsum without micro sculpture, head and pronotum with puncturation sparse and superficial, ratio of 3rd/2nd antennal segments = 1.6 (Fig. 9) Sichuan *A. schneideri* sp. n.
- 7 Clypeus protuberant (Fig. 22) Head and pronotum reddish, elytra black, antennae uniformly testaceous, puncturation double on head and pronotum, elytra with 8 punctured rows, ratio of 3rd/2nd antennal segments = 1.4 (Fig. 20) Length 3.3 mm. Sichuan *Cyrtoplastus chinensis* sp. n.
- Clypeus not protuberant (Figs 29, 30, 39) 8
- 8 Clypeus not excavate (Figs 29, 30), elytra with clearly defined punctured rows *Stetholodes* 9
- Clypeus excavate (Figs 39, 40, 50), elytra without well defined rows of punctures *Agathidium* 10
- 9 Length 3.4-3.5 mm, dorsum black, antennae testaceous with black club, pronotum with uniform and distinct micro-sculpture. Sichuan *Stetholodes tunan* sp. n.
- Length 2.3-2.4 mm, dorsum reddish brown, antennae uniformly testaceous, pronotum with superficial micro-sculpture at sides, traces on disc. Gansu *S. chinense* sp. n.
- 10 Lateral outline of elytra with distinct humeral angle, metasternum without femoral lines. subg. *Neoclebe* 11
- Lateral outline of elytra with indistinct, weak humeral angles, metasternum with femoral lines 13
- 11 Elytra with micro-reticulation. Dorsum black with sides lighter colored, antennae testaceous with black club, whole dorsum with well unpressed puncturation, ratio of 3rd/2nd antennal segments = 1.6, (Fig. 37) Sichuan *Ag. dundai* sp. n.
- Elytra without micro-reticulation 10
- 12 Length 3.5 mm, antennae testaceous with 7th-11th segment darker, clypeal line fine and superficial, ratio of 3rd/2nd antennal segments = 1.2, whole dorsum with well unpressed puncturation, head widest just behind eyes, black, reddish brown at sides of pronotum and at suture. Fujian *Ag. bonzi*
- Length 2.5-2.8 mm, antennae testaceous with 9th and 10th segments darker, clypeal line well unpressed, ratio of 3rd/2nd antennal segments = 1.5, head and pronotum with sparse and superficial puncturation, elytra with double puncturation, head widest at eyes, dorsum black. Fujian *Ag. unicolorum*
- 13 Eyes flattened or moderately protuberant, not haemispherical, clypeus with or without unpressed line-subg. *Agathidium* s. str. 14
- Eyes haemispherical, clypeus with continuous or medially interrupted posterior carina, or with short oblique groove at each side. subg. *Microcele*. Dorsum black, antennae testaceous with antennal segments 9-10 black, micro-reticulation superficial on head and pronotum, striolate on clypeus, puncturation sparse on head and pronotum, clear on elytra, ratio of 3rd/2nd antennal segments = 1.4 (Fig. 70) Length 4.1 mm. Yunnan *Ag. melanarum* sp. n.
- 14 Clypeus at anterior-lateral margin with raised bead 15
- Clypeus without anterior lateral raised marginal bead 17
- 15 Elytra with sutural striae. Dorsum reddish-brown or black, antenna uniformly testaceous, whole dorsum with traces of micro-reticulation, puncturation sparse on head and pronotum, clear on elytra, ratio of 3rd/2nd antennal segments = 1.8 (Fig. 38) Length 3.2-4.3 mm. Yunnan *Ag. alatum heishuiense* ssp. n.
- Elytra without sutural striae 16
- 16 Head widest just behind eyes (Fig. 50), dorsum dark reddish-brown, elytra black, antennae testaceous with antennal club black, micro-reticulation absent, puncturation clear but sparse on whole dorsum, ratio of 3rd/2nd antennal segments = 1.5 (Fig. 48) Length 2.7 mm. Sichuan *Ag. kepaii* sp. n.
- Head widest at eyes (Fig. 51), dorsum black, antennae testaceous with segments 7-11 black, micro-reticulation in vague traces on elytra, puncturation sparse on whole dorsum, ratio of 3rd/2nd antennal segments = 1.5 (Fig. 49) Length 2.6-2.8 mm. Yunnan *Ag. beccarii* sp. n.
- 17 Elytra with sutural striae 18



- Elytra without sutural striae 19
- 18 Length 3.1 mm, dorsum black with sides of pronotum and sutura reddish brown, antennae uniformly testaceous, head and pronotum with well impressed puncturation, elytra with larger, impressed punctures, ratio of 3rd/2nd antennal segments = 1.3. Metathoracic wings fully developed. Sichuan. *Ag. chinense*
- Length 3.7-4.1 mm, dorsum black, antennae uniformly testaceous or with 9-10 antennal segments dark, whole dorsum with clear puncturation, ratio of 3rd/2nd antennal segments = 2.0 (Fig. 59). Metathoracic wings absent. Yunnan. *Ag. uliginosum* sp. n.
- 19 Length 3.1 mm. Dorsum dark reddish-brown, antennae with black antennal club, ratio of 3rd/2nd antennal segments = 1.5. Puncturation sparse and regular, wings fully developed. Fujian. *Ag. fukiense*
- Length 4.1 mm. Dorsum black, antennae uniformly testaceous, ratio of 3rd/2nd antennal segments = 1.4 (Fig. 60). Puncturation clear on whole dorsum, wings lacking. Yunnan. *Ag. yunnanicum* sp. n.

*Anisotoma králi* sp. n. (Figs 1, 3, 5, 7, 8)

TYPE MATERIAL. Holotype, male, China, Yunnan [prov. ], 3800-4600 m [above sea level], 27°19'N 100°08'E, Habashan mts. E Slope, 15 vii 1992, D. Král leg.; deposited in coll. Švec, paratypes 2 male, 4 female, Yunnan [prov. ], Heishui [?], 35 km N of Lijiang, 1-19 vii 1992, S. Bečvář leg.; 1 male and 3 female deposited in coll. Švec, the others in coll. Angelini.

Length 3.5 mm, head 0.7 mm, pronotum 0.9 mm, elytra 1.9 mm, width of head 0.8 mm, pronotum 1.9 mm, elytra 2.0 mm. Height of pronotum 0.9 mm, elytra 1.3 mm. Dorsum black, anterior part of head and sides of elytra reddish-brown, underside reddish-brown, metasternum and abdomen black, antennae testaceous with antennal club black, legs reddish-brown. Head with micro-sculpture only on clypeus, head and pronotum with well impressed puncturation, each elytron with nine rows of punctures. Sutural striae well impressed and extending within to the middle of elytra.

Head. Punctures moderately large and impressed, spaced by 0.5 times their diameter, scarcely small ones interposed. Fovea at each side of clypeus, clypeal line well impressed, eyes rounded and protuberant (Fig. 3), length ratio of 3rd/2nd antennal segment = 1.5, the 3rd segment longer than 4th + 5th (Fig. 1). Hamann's organ: gutter with one vesicle in both 9th and 10th antennal segments, gutter without vesicles in the 7th segment.

Pronotum. Punctures as large and impressed as on head, spaced by 0.5-6.0 times their diameter, some very small punctures interposed. Anterior margin very emarginate, lateral outline broadly rounded, subparallel (Fig. 5).

Elytra. Seriate punctures large and impressed, spaced by 0.5 times their own diameter, punctures of intervals very small and superficial, spaced by 2-6 times their diameter. Lateral outline with sharp humeral angle.

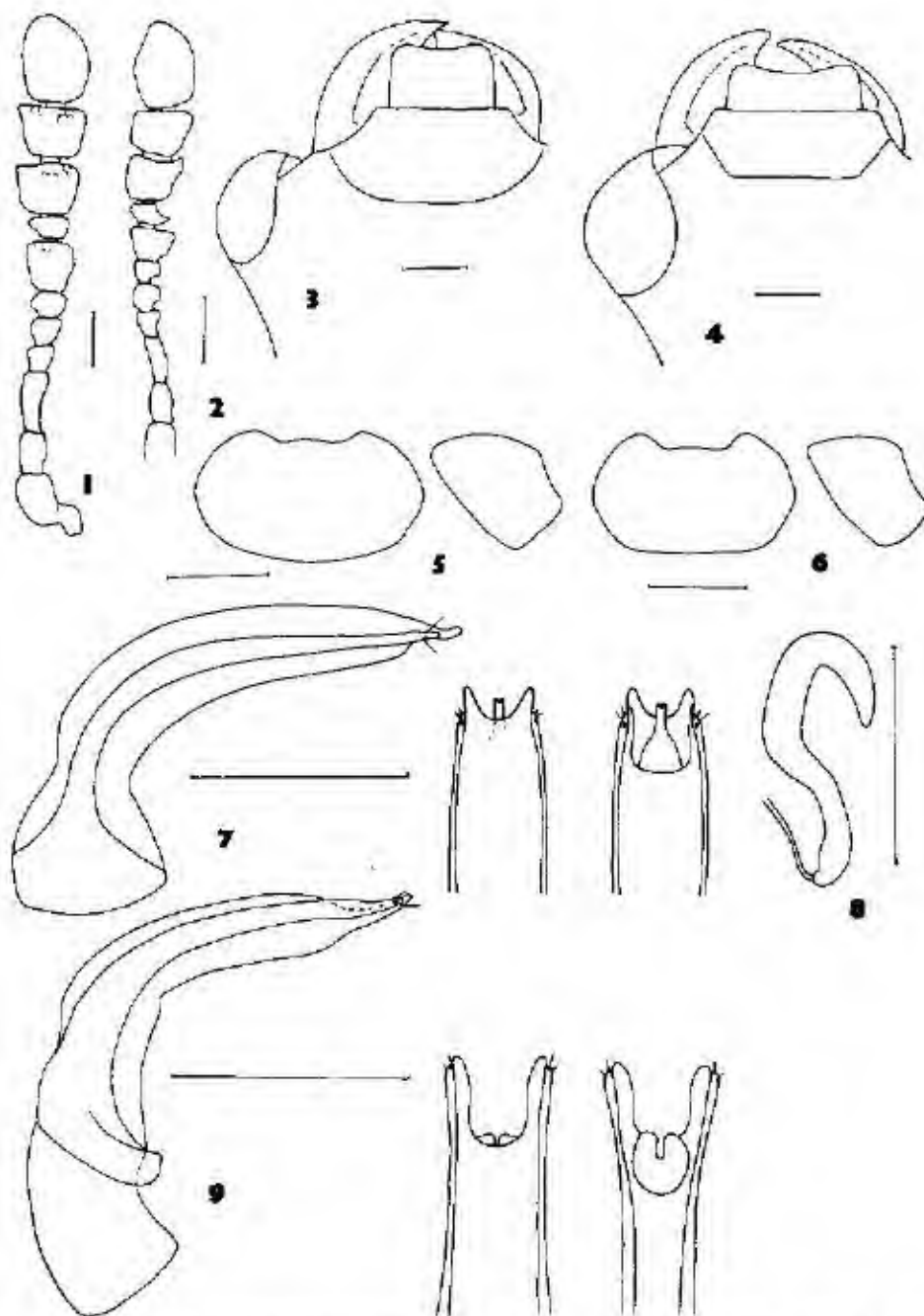
Meso- and metasternum. Weak median carina at the anterior third, lateral lines complete, femoral lines absent. Wings fully developed.

Legs. Tarsal formula in male 5-5-4, female unknown.

Aedeagus. As in Fig. 7.

DERIVATIO NOMINIS. Dedicated to Dr David Král, zoologist from Prague, collector of this species.

DIFFERENTIAL DIAGNOSIS. *Anisotoma králi* sp. n. is similar to *A. frontalis* (Portevin, 1926-1927) by the presence of nine complete punctured rows on elytra and by absence of micro-sculpture on pronotum. It differs clearly by presence of micro-sculpture only on clypeus (head entirely micro-sculptured in *A. frontalis* and *A. besucheti* Angelini & De Marzo, 1988) and by the shape of aedeagus.



Figs 1-9. Figs 1, 3, 5, 7, 8. *Anisotoma krati* sp. n. Figs 2, 4, 6, 9. *Anisotoma nigra* sp. n. Figs 1, 2 - antenna, 3, 4 - head, 5, 6 - pronotum, 7, 9 - aedeagus, 8 - spermatheca. Scale in Figs 1, 2, 3, 4, 8 = 0.1 mm, in 5, 6, 7, 9 = 0.5 mm.

*Anisotoma nigra* sp. n. (Figs 2, 4, 6, 9)

TYPE MATERIAL. Holotype, male, China, Yunnan [prov.], Heishui[1], 35 km N of Lijiang, 1-19.vii. 1992, S. Bečvář leg., deposited in coll. Švec. Paratype, male, the same data, deposited in coll. Angelini, paratype, male, Yunnan [prov.], Heishui, 35 km N of Lijiang, 19.vi.-1.vii.1993, S. Bečvář leg., deposited in coll. Švec.

Length 3.9 mm, head in holotype 0.8 mm, pronotum 1.0 mm, elytra 2.1 mm, width of head 1.0 mm, pronotum 2.1 mm, elytra 2.2 mm, height of pronotum 1.2 mm, elytra 1.7 mm. Dorsum black, underside reddish-brown, mesosternum paler, antennae testaceous, black at segments 7 - 11, legs reddish-brown. Micro-reticulation absent on the whole dorsum. Punctuation distinct on head and pronotum, each elytron with 9 rows of punctures. Sutural striae well impressed and extending within to the third of length of elytra.

Head. Punctures moderately large, impressed, spaced by 1 - 2 times their diameter. Fovea at each side of clypeus, clypeal line well impressed, eyes round and protuberant (Fig. 4). Length ratio of 3rd/2nd antennal segments = 1.2, 3rd segment shorter than 4th + 5th segments altogether (Fig. 2).

Pronotum. Punctuation as that on head. Anterior margin very emarginate, lateral outline with subparallel sides (Fig. 6).

Elytra. Seriate punctures large and impressed, spaced by 0.3 - 0.5 times their diameter. Punctures at intervals as those on head, impressed, spaced by 2 - 4 times their diameter, rare larger punctures interposed. Just a little broader than long and moderately convex. Lateral outline with sharp humeral angle.

Meso- and metasternum. Median carina weak, lateral lines complete. Femoral lines lacking. Wings fully developed.

Legs. Tarsal formula 5-5-4 in male, female unknown.

Aedeagus. As in Fig. 9.

DERIVATIO NOMINIS: Derived from the color of dorsum.

DIFFERENTIAL DIAGNOSIS. The new species differs from similar *A. becvári* sp. n. by larger size, color of antennae and by the smaller ratio of 3rd/2nd antennal segments.

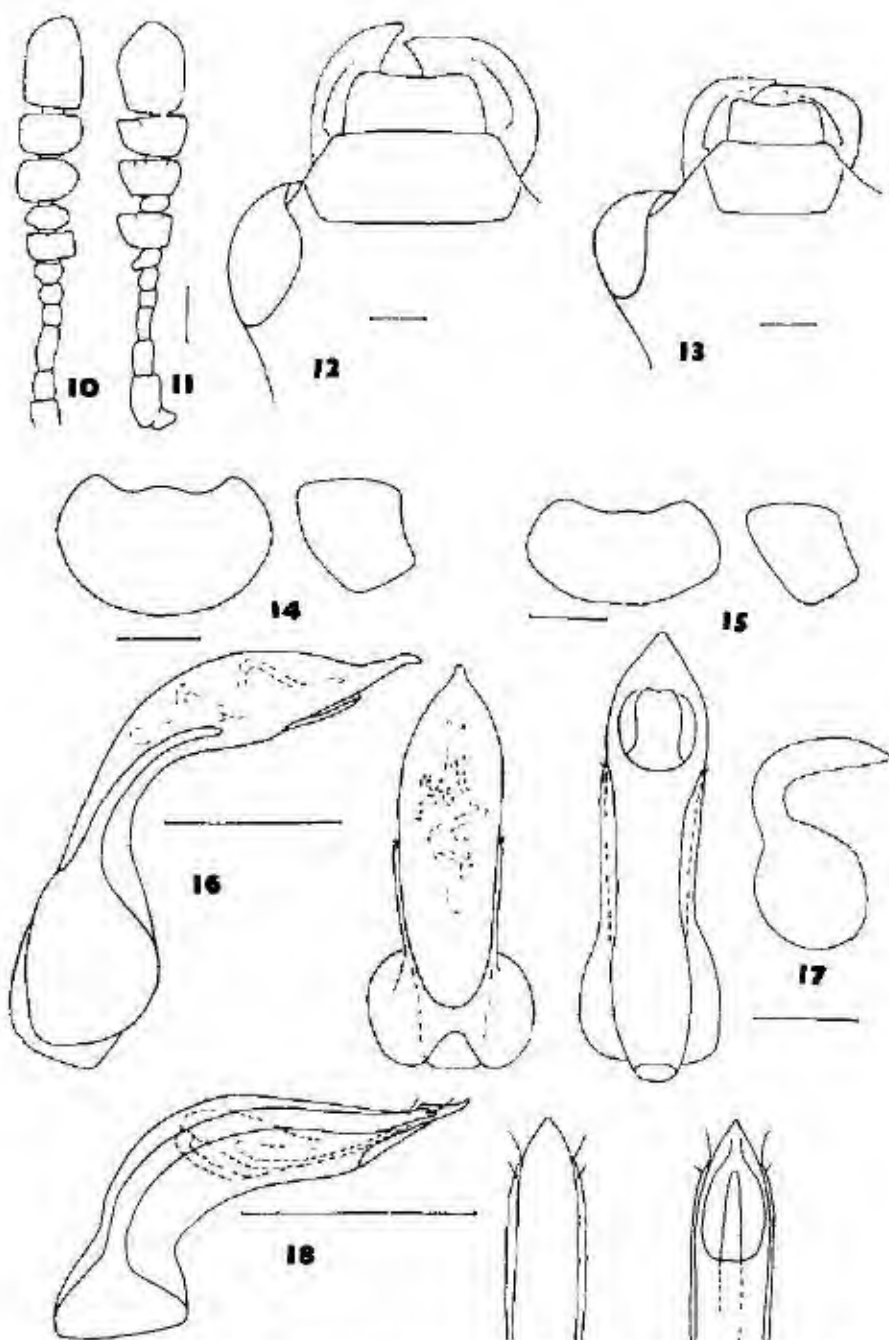
*Anisotoma becvári* sp. n. (Figs 10, 12, 14, 16, 17)

TYPE MATERIAL. Holotype, male, China, Yunnan [prov.], Heishui[1], 35 km N of Lijiang, 1-19.vii.1992, S. Bečvář leg., deposited in coll. Švec. Paratypes 5 male, 8 female, the same data, 6 male and 3 female, the same locality, 18.vi.-4.vii.1993, S. Bečvář leg., deposited in coll. Švec (4 male, 7 female), in coll. Angelini (4 male, 2 female) and in coll. Bečvář (2 male, 2 female).

Length 2.6 - 3.0 mm, in holotype 3.0 mm, head 0.7 mm, pronotum 0.7 mm, elytra 1.6 mm, width of head 0.8 mm, pronotum 1.3 mm, elytra 1.5 mm, height of pronotum 0.7 mm, elytra 1.0 mm. Dorsum black, underside dark reddish-brown, metasternum black, antennae testaceous, black at segments 9 - 11, legs reddish-brown. Micro-reticulation lacking on the whole dorsum. Each elytron with 9 complete rows of punctures. Sutural striae well impressed and extending within the apical half of elytra.

Head. Punctures large and impressed, spaced by 0.5 - 2.0 times their diameter. Fovea at each side of clypeus, clypeal line well impressed, eyes rounded and protuberant (Fig. 12). Length ratio of 3rd/2nd antennal segments = 1.5, the 3rd segment longer than 4th + 5th together (Fig. 10).

Pronotum. Punctures 0.5 times as larger as those on head, superficial, spaced by 1 - 4 times their diameter. Anterior margin very emarginate, lateral outline with subparallel sides (Fig. 14).



Figs 10-18 Figs 10, 12, 14, 16, 17 *Ausotoma becvani* sp. n., Figs 11, 13, 15, 18 *Ausotoma dundat* sp. n.  
 Figs 10, 11 - antenna, 12, 13 - head, 14, 15 - pronotum, 16, 18 - aedeagus, 17 - spermatheca. Scale in Figs 10, 11,  
 12, 13, 17 = 0.1 mm, in 14, 15, 16, 18 = 0.5 mm

Elytra. Seriate punctures large and impressed, spaced by 0.5 - 1.0 times their diameter. Interval punctures as on pronotum, sparsely distributed, rare small punctures interposed. Lateral outline with sharp humeral angle.

Meso- and metasternum. Median carina lacking, lateral lines complete, femoral lines absent. Wings fully developed.

Legs. Tarsal formula in male 5-5-4, female 4-4-4.

Aedeagus. As in Fig. 16.

Spermatheca. As in Fig. 17.

DERIVATIONOMINIS. Dedicated to its collector, Ing. Stanislav Bečvář, entomologist from České Budějovice.

DIFFERENTIAL DIAGNOSIS. See discussion of *A. králi* sp. n. and *A. nigra* sp. n.

*Anisotoma dundai* sp. n. (Figs 11, 13, 15, 18)

TYPE MATERIAL. Holotype, male, China, Sichuan prov., Kangding distr., Hailougou Glacier Park, Gongga Shan mt., Moxi [vill.], 2500 m above sea level, 24.vii.1992. R.Dunda leg., deposited in coll. Švec.

Length 2.7 mm, head 0.5 mm, pronotum 0.6 mm, elytra 1.6 mm, width of head 0.6 mm, pronotum 1.3 mm, elytra 1.5 mm, height of pronotum 0.7 mm, elytra 0.9 mm. Head black, pronotum and elytra dark reddish-brown, underside black, metasternum reddish-brown, antennae testaceous with antennal club black, legs reddish-brown. Dorsum of head and pronotum striolate. Each elytron with 8 complete rows of punctures, the 9th one confluent with lateral channel. Sutural striae well impressed and extending beyond the middle of elytra.

Head. Micro-sculpture well impressed, punctures moderately large and superficial, spaced by 1 - 2 times their diameter. Fovea at each side of clypeus, clypeal line well impressed. Eyes rounded and protuberant (Fig. 13). Length ratio of 3rd/2nd antennal segments = 1.0, 3rd segment shorter than 4th + 5th (Fig. 11). Hamanns organ: gutter without vesicles in both 9th and 10th antennal segments, gutter without vesicles in the 7th segment.

Pronotum. Micro-sculpture less impressed than on head. Punctures a little larger but as impressed as on head, irregularly distributed, spaced by 1 - 10 times their diameter. Anterior margin very emarginate, lateral outline with subparallel sides (Fig. 15).

Elytra. Row punctures large and impressed, spaced by 0.5 time their diameter, punctures of intervals very small and superficial, spaced by 3 - 6 times their diameter. Elytra just a little broader than pronotum, a little longer than broad, moderately convex. Lateral outline with sharp humeral angle.

Meso- and metasternum. Median carina slightly developed at the anterior third, lateral lines complete, femoral lines absent. Wings present.

Legs. Tarsal formula in male 5-5-4, female unknown.

Aedeagus. As in Fig. 18.

DERIVATIONOMINIS. Dedicated to Mr Radek Dunda, entomologist from Prague.

DIFFERENTIAL DIAGNOSIS. *Anisotoma dundai* sp. n. is very similar by micro-sculpture of head and pronotum, punctured rows of elytra and by absence of humeral spot on elytra to *A. korotjaevi* Perkovsky, 1987 and *A. castanea* (Herbst, 1792). It clearly differs by smaller length and by dark color of dorsum. From *A. korotjaevi* it differs also by sparser puncturation of elytral intervals.

*Anisotoma curta* (Portevin, 1927)

*Eucyrtia curta* Portevin, 1927: 83, 93.

*Anisotoma curta*, Wheeler, 1979: 301-303, Angelini & De Marzo, 1988: 56-57.

MATERIAL EXAMINED 1 female, China, Sichuan [prov.], Lüziping [vill.], 28 vi 1991, R. Dunda leg., deposited in coll. Švec

The specimen examined is similar by all characters to the types from Japan. New for China

*Anisotoma schneideri* sp. n. (Figs 19, 21, 23, 25, 26)

TYPE MATERIAL. Holotype, male, China, Sichuan prov., Kangding distr., Sahde, 3500 m [above sea level], vi 1992, Schneider leg., deposited in coll. Švec. Paratype, female, the same data, deposited in coll. Angelini. Paratype, male, China, Yunnan [prov.], Heishui, 35 km N of Lijiang, 27°13'N, 100°19'E, 18 vi - 4 vii 1993, deposited in coll. Schneider

Length 4.2-4.3 mm, in holotype 4.3 mm, head 0.9 mm, pronotum 1.1 mm, elytra 2.3 mm, width of head 1.0 mm, pronotum 2.3 mm, elytra 2.5 mm. Height of pronotum 1.1 mm, elytra 1.5 mm. Head and elytra black, pronotum reddish-brown, venter of head black, pro- and mesosternum reddish-brown, metasternum and abdomen dark reddish-brown. Antennae testaceous with black antennal club, legs reddish brown. Whole dorsum without micro-sculpture. Each elytron with 8 complete punctured rows, the 9th confluent with lateral channel. Sutural striae well impressed and extending within to the midlength of elytra.

Head. Punctures very small and superficial, spaced by 1 - 6 times their diameter, scarce large punctures impressed on clypeus. Fovea at each side of clypeus. Clypeal line well impressed, eyes rounded and protuberant (Fig. 21). Length ratio of 3rd/2nd antennal segments = 1.6, 3rd segment shorter than 4th + 5th (Fig. 19). Hamann's organ - gutter without vesicles in both 9th and 10th antennal segments, gutter without vesicles in the 7th segment.

Pronotum. Punctures a little larger and more unpressed than on head, spaced by 2 - 4 times their diameter. Anterior margin very emarginate, lateral outline with subparallel sides (Fig. 23).

Elytra. Row punctures large and impressed, puncturation of intervals sparse and doubled, of two sizes. Principal punctures smaller than those in series, spaced by 8 - 15 times their diameter, the others very small and superficial, spaced by 3 - 10 times their diameter. Lateral outline with sharp humeral angle.

Meso- and metasternum. Median carina slightly developed at the anterior third, lateral lines complete, femoral lines absent. Wings fully developed.

Legs. Tarsal formula in male 5-5-4, in female 5-4-4.

Aedeagus. As in Fig. 25.

Spermatheca. As in Fig. 26.

DERIVATION NOMINIS. Dedicated to Mr Jan Schneider, specialist in Silphidae from Prague.

DIFFERENTIAL DIAGNOSIS. *Anisotoma schneideri* sp. n. is related to *A. curia* by the presence of eight complete punctures rows on elytra and by absence of micro-sculpture on head, it differs by reddish-brown colored pronotum and larger size as well as by the shape of external genitalia.

*Cyrtoplastus chinensis* sp. n. (Figs 20, 22, 24)

TYPE MATERIAL. Holotype, female, China, N Sichuan [prov.], 30 km W of Nuoping, 11-16 vi 1992, Jiazhagou, 2100 m [above sea level], J. Turna leg., deposited in coll. Švec

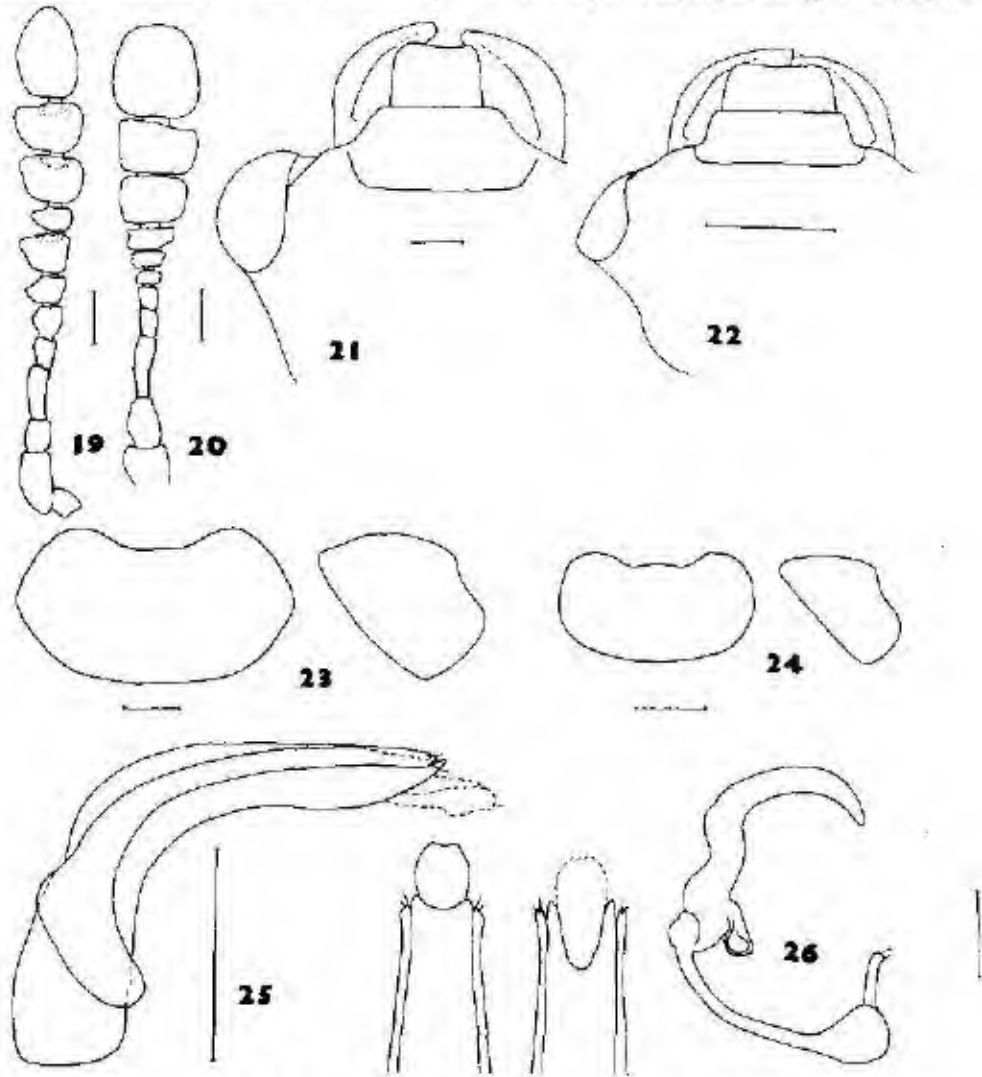
Length 3.3 mm, head 0.7 mm, pronotum 0.8 mm, elytra 1.8 mm, width of head 1.3 mm, pronotum 1.6 mm, elytra 2.0 mm, height of pronotum 0.9 mm, elytra 1.5 mm. Head and pronotum reddish, elytra black, underside of head, prosternum and mesosternum reddish-brown, metasternum and abdomen black. Antennae uniformly testaceous, legs reddish-brown. Whole dorsum without micro-sculpture, punctation double on head and pronotum, elytron with 8



punctured rows. Sutural striae superficial, extending the first fourth of length of elytra.

Head. Main punctures large and impressed, spaced by 1.0 - 1.5 times their own diameter; the others very small and superficial, spaced by 2 - 10 times their own diameter. Fovea at each side of clypeus, clypeal line superficial. Eyes round and protuberant, clypeus protuberant (Fig. 22). Ratio of 3rd/2nd antennal segments = 1.3, 3rd segment longer than 4th + 5th altogether (Fig. 20).

Pronotum. Main punctures a little larger and more impressed than those on head, spaced by 1 - 8 times their diameter, the smaller ones very small and superficial, separated by 1 - 20 times



Figs 19-26. Figs 19, 21, 23, 25, 26: *Anisotoma schneideri* sp. n., Figs 20, 22, 24: *Cyrtoplastus chinensis* sp. n. Figs 19, 20 - antenna, 21, 22 - head, 23, 24 - pronotum, 25 - aedeagus, 26 - spermatheca. Scale in Figs 19, 20, 21, 26 - 0.1 mm, in 23, 24 - 0.2 mm, in 22, 25 - 0.5 mm.

their diameter. Anterior margin very emarginate, lateral outline broadly rounded, with subparallel sides (Fig. 24).

Elytra. Row punctures impressed, separated by 2-3 times their own diameter, punctures of intervals very small and superficial, spaced by 3-10 times their diameter. Lateral outline with distinct humeral angle.

Meso- and metasternum. Median carina absent, lateral lines complete, femoral lines absent. Wings fully developed.

Legs. Tarsal formula in female 4-4-4, male unknown.

Genitalia. Not examined because of the rigidity of the type.

DERIVATIO NOMINIS. Derived from the name of the country of origin.

DIFFERENTIAL DIAGNOSIS. *Cyrtoplastus chinensis* sp. n. differs clearly from all known European and Asiatic species of the genus by striking bicoloring of the body.

*Stetholiodes turnai* sp. n. (Figs 27, 29, 31, 33, 34)

TYPE MATERIAL. Holotype, male, China, N Sichuan [prov.], 30 km W from Nanping, Jiuzhaigou, 3100 m [above sea level], 13.-15. vi 1992, J. Turna leg., deposited in coll. Švec. Paratypes, 2 females, the same data, depos. in collections of Angelini and J. Turna.

Length 3.4-3.5 mm, in holotype 3.5 mm, head 0.7 mm, pronotum 1.0 mm, elytra 1.8 mm, width of head 0.9 mm, pronotum 1.7 mm, elytra 1.7 mm, height of pronotum 1.1 mm, elytra 0.9 mm. Dorsum black, venter of head, metasternum and abdomen black, mesosternum reddish-brown. Antennae testaceous with black club, legs reddish-brown. Head and pronotum with superficial micro-sculpture, each elytron with 9 rows of punctures. Sutural striae well impressed and extending within to the midlength of elytra.

Head. Punctures moderately large and impressed, spaced by 0.5 - 1.0 times their diameter, clypeal line absent. Head widest just behind eyes (Fig. 29). Ratio of 3rd/2nd antennal segments = 1.2, 3rd segment longer than the 4th + 5th ones (Fig. 27). Hamanns organ; gutter without vesicle in both 9th and 10th antennal segments.

Pronotum. Micro-sculpture more impressed than on head, punctures a little larger and more impressed than on head, spaced by 0.5 - 2.0 times their diameter. Anterior margin scarcely curved, lateral outline with subparallel sides (Fig. 31).

Elytra. Seriate punctures large and impressed, spaced by 0.5 time their diameter, punctures of intervals smaller, superficial, spaced by 0.5 - 3.0 times their diameter. Lateral outline with sharp humeral angle.

Meso- and metasternum. Median carina absent, lateral lines complete, femoral lines absent. Wings fully developed.

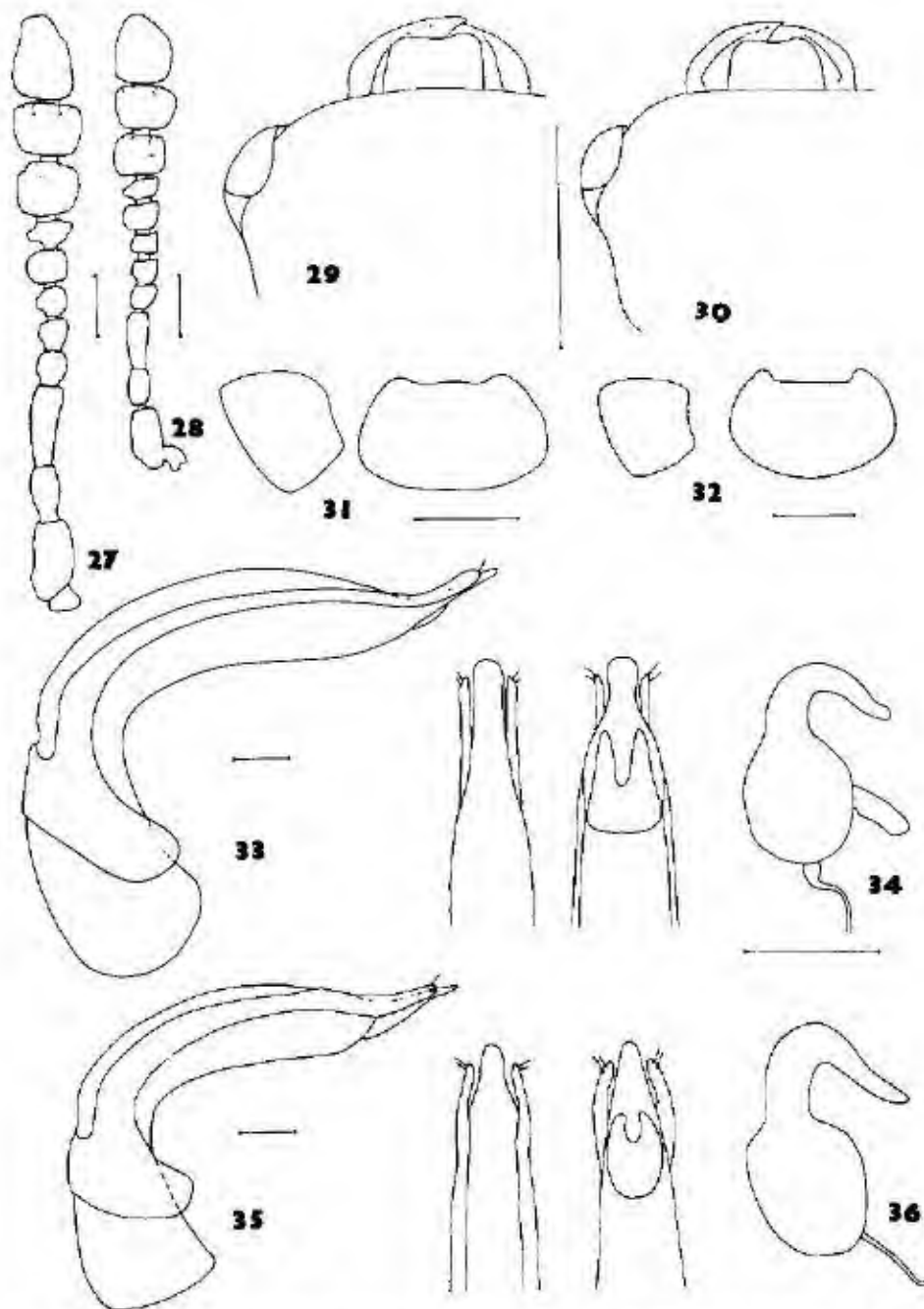
Legs. Tarsal formula in male 5-5-4, in female 5-4-4.

Aedeagus. As in Fig. 33.

Spermatheca. As in Fig. 34.

DERIVATIO NOMINIS. Dedicated to Mr Jaroslav Turna, collector of the species, specialist in Tenebrionidae from Kostelec na Hané, Czech Republic.

DIFFERENTIAL DIAGNOSIS. *Stetholiodes turnai* sp. n. is very similar to *S. striatipenne* (Portevin, 1926) and *S. chinense* sp. n.. It differs by dark coloring dorsum and antennal club, from *S. striatipenne* it differs also by more superficial micro-sculpture on head and by the shape of head more narrower behind eyes. From *S. chinense* sp. n. it differs also by uniform micro-sculpture of pronotum and by larger size.



Figs 27-36. Figs 27, 29, 31, 33, 34: *Stetholiodes turnai* sp. n. Figs 28, 30, 32, 35, 36: *Stetholiodes chinense* sp. n. Figs 27, 28 - antenna, 29, 30 - head, 31, 32 - pronotum, 33, 35 - aedeagus, 34, 36 - spermatheca. Scale in Figs 27, 28, 33, 34, 35, 36 = 0.1 mm, in 29, 30, = 0.5 mm, in 32 = 0.7 mm, in 31 = 1.0 mm

*Stetholiodes chinense* sp. n. (Figs 28, 30, 32, 35, 36)

TYPE MATERIAL. Holotype, male, China, Gansu prov., 120 km SW Lanzhou, Ponggartang, 30 vi 1992, J Turnai leg., in coll. Švec. Paratypes 2 female, the same data, in coll. Angelini and in coll. Švec.

Length 2.3-2.4 mm, in holotype 2.3 mm, head 0.2 mm, pronotum 0.5 mm, elytra 1.6 mm, width of head 0.9 mm, pronotum 1.4 mm, elytra 1.4 mm. Height of pronotum 0.9 mm, elytra 1.3 mm. Dorsum uniformly reddish-brown as well as the underside, metasternum black. Antennae uniformly testaceous, legs reddish-brown. Head and sides of pronotum with superficial micro-sculpture, disc of pronotum with traces of micro-sculpture, each elytron with 9 rows of punctures. Sutureal striae well impressed and extending within to the midlength of elytra.

Head. Punctures moderately large and impressed, spaced by 0.5 - 1.0 times their diameter. Clypeal line absent, head widest just behind eyes (Fig. 30). Ratio of length of 3rd/2nd antennal segments = 1.5, 3rd segment shorter than 4th + 5th (Fig. 28). Hamann's organ gutter with one vesicle in both 9th and 10th antennal segments.

Pronotum. Punctures as on head, spaced by 0.5 - 2.0 times their diameter. Anterior margin very emarginate, lateral outline broadly rounded and with subparallel sides (Fig. 32).

Elytra. Row punctures large and unimpressed, spaced by 0.5 times their diameter, punctures of intervals very small and superficial, separated by 1.0 their diameter. Lateral outline with sharp humeral angle.

Meso- and metasternum. Median carina absent, lateral lines complete, femoral lines absent. Wings fully developed.

Legs. Tarsal formula in male 5-5-4, in female 4-4-4.

Aedeagus. As in Fig. 35.

Spermatheca. As in Fig. 36.

DERIVATION NOMINIS. Derived from the name of the country of origin.

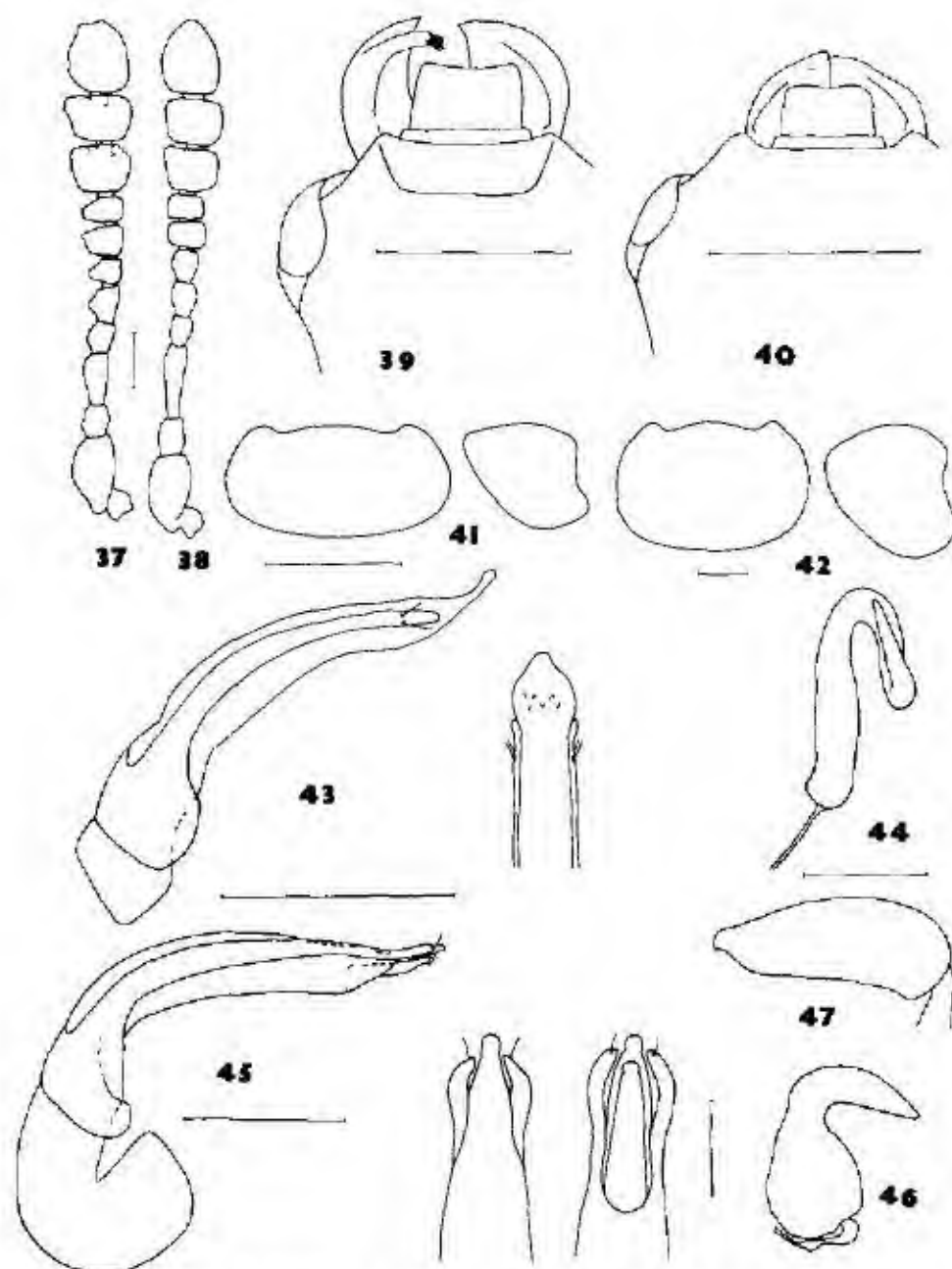
DIFFERENTIAL DIAGNOSIS. *Stetholiodes chinense* sp. n. is very similar to *S. striatipenne* and *S. turnai* sp. n. It differs from the both species by reddish-brown colored dorsum and by disc of pronotum nearly without micro-sculpture. Dorsum in *S. turnai* is black, *S. striatipenne* is bicolor: red; black elytra, reddish-brown head, pronotum and elytral apex. Pronotum in the both mentioned species wholly micro-sculptured.

*Agathidium (Neocele) dunda* sp. n. (Figs 37, 39, 41, 43, 44)

TYPE MATERIAL. Holotype, male, China, Sichuan prov., Kangding distr., Hailougou Glacier Park, Gongga Shan mts., Moxi [vill.], 2500 m [above sea level], 24 vii 1992, R. Dunda leg., deposited in coll. Švec. Paratypes 28 males, 13 females, the same data, R. Dunda & J. Schneider leg., deposited in coll. Švec (20 males and 8 females), in coll. Angelini (2 males, 1 female), Dunda (2 males, 2 females), Schneider (2 males, 2 females) and in coll. J. Cooter from Hereford (1 male, 1 female).

Length 2.9-3.4 mm, in holotype 2.9 mm, head 0.5 mm, pronotum 0.8 mm, elytra 1.6 mm, width of head 1.0 mm, pronotum 1.6 mm, elytra 1.7 mm, height of pronotum 0.8 mm, elytra 1.2 mm. Dorsum black, sides of pronotum lighter coloured, venter black, mesosternum reddish-brown. Antennae testaceous with black club, legs reddish-brown. Micro-reticulation present on elytra only, whole dorsum with well impressed puncturation. Sutureal striae well impressed and reaching beyond the midlength of elytra.

Head. Puncturation double, principal punctures large and impressed, spaced by 0.5 - 2.0 times their diameter, smaller punctures superficial and sparser. Fovea at each side of clypeus, clypeal line superficial, head widest just behind eyes (Fig. 39). Left mandibula with backward curved horn in male, clypeus less excavate. Ratio of length of the 3rd/2nd antennal segments =



Figs 37-47 Figs 37, 39, 41, 43, 44 *Agathidium (Neoceble) dundai* sp. n. Figs 38, 40, 42, 45, 46, 47 *Agathidium (Agathidium) alatum heishuiense* sp. n. Figs 37, 38 - antenna, 39, 40 - head, 41, 42 - pronotum, 43, 45 - aedeagus, 46 - spermatheca, 47 - hind femur. Scale in Figs 37, 38, 44, 46, 47 - 0.1 mm, in 39, 40, 42, 43, 45 - 0.5 mm, in 41 - 1.0 mm.

1.6, 3rd segment shorter than 4th + 5th (Fig. 37). Hamulus organ: gutter without vesicles in both 9th and 10th segments.

Pronotum. Puncturation double, as on head. Anterior margin very emarginate, lateral sides subparallel (Fig. 41).

Elytra. Punctures as large as on head but more superficial, separated by 0.5 - 1 times their diameter. Lateral outline with sharp humeral angle.

Meso- and metasternum. Median carina slightly developed, lateral lines complete, femoral lines lacking, wings fully developed.

Legs. Tarsal formula in male 5-5-4, in female 5-4-4.

Aedeagus. As in Fig. 43.

Spermatheca. As in Fig. 44.

BIONOMICS. The type specimens were obtained from blossoming Apiaceae which is quite unusual in the genus.

DERIVATIONOMINIS. Dedicated to Mr Radek Dunda, one of the collectors of the new species.

DIFFERENTIAL DIAGNOSIS. *Agathidium dundai* sp. n. differs from the related *A. bonzi* and *A. unicolorum* by presence of micro-reticulation on elytra. From *A. charomicum* Perkovsky, 1987 it differs by color of antennae and by absence of micro-reticulation on head and pronotum, from *A. acherontium* Perkovsky, 1991 it differs by the presence of clypeal line and by head widest just behind eyes.

*Agathidium (Agathidium) alatum heishuiense* ssp. n. (Figs 38, 40, 42, 45, 46, 47)

TYPE MATERIAL. Holotype, imago, China, Yunnan [prov.], Heishuiji, 35 N of Lijiang, 1.-19.vii.1992, S. Bečvář leg., deposited in coll. Švec. Paratypes 17 male, 17 female, the same data, paratypes 3 males, the same locality (called as Heishui) and collector, 19.vi.-4.vii.1993; deposited in coll. Švec (19 males, 10 females) and in coll. Angelini (4 males, 4 females).

Length 3.2 - 4.3 mm, in holotype 4.3 mm, head 1.0 mm, pronotum 1.3 mm, elytra 2.0 mm, width of head 1.3 mm, pronotum 2.0 mm, elytra 2.0 mm, height of pronotum 1.4 mm, elytra 1.1 mm. Dorsum dark reddish brown or black, lighter at sides. Underside reddish - brown, mesosternum paler, antennae uniformly testaceous, legs reddish-brown. Whole dorsum with traces of micro-reticulation. Puncturation sparse on head and pronotum, clear on elytra. Sutural striae well impressed and extending to the midlength of elytra.

Head. Punctures small but impressed, spaced by 2 - 4 times their diameter. Clypeal anterior - lateral margin with raised bead, clypeal line absent. Clypeus moderately excavate. Head widest just behind eyes (Fig. 40). Length ratio of 3rd/2nd antennal segments = 1.8, 3rd segment longer than 4th + 5th altogether (Fig. 38).

Pronotum. Punctures as on head. Anterior margin slightly curved, lateral outline broadly rounded (Fig. 42).

Elytra. Punctures large and impressed, separated by 0.5 - 1.0 times their diameter. Lateral outline with slight humeral angle.

Meso- and metasternum. Median carina slight, lateral lines lacking, femoral lines complete, curved at mid-length. Wings fully developed.

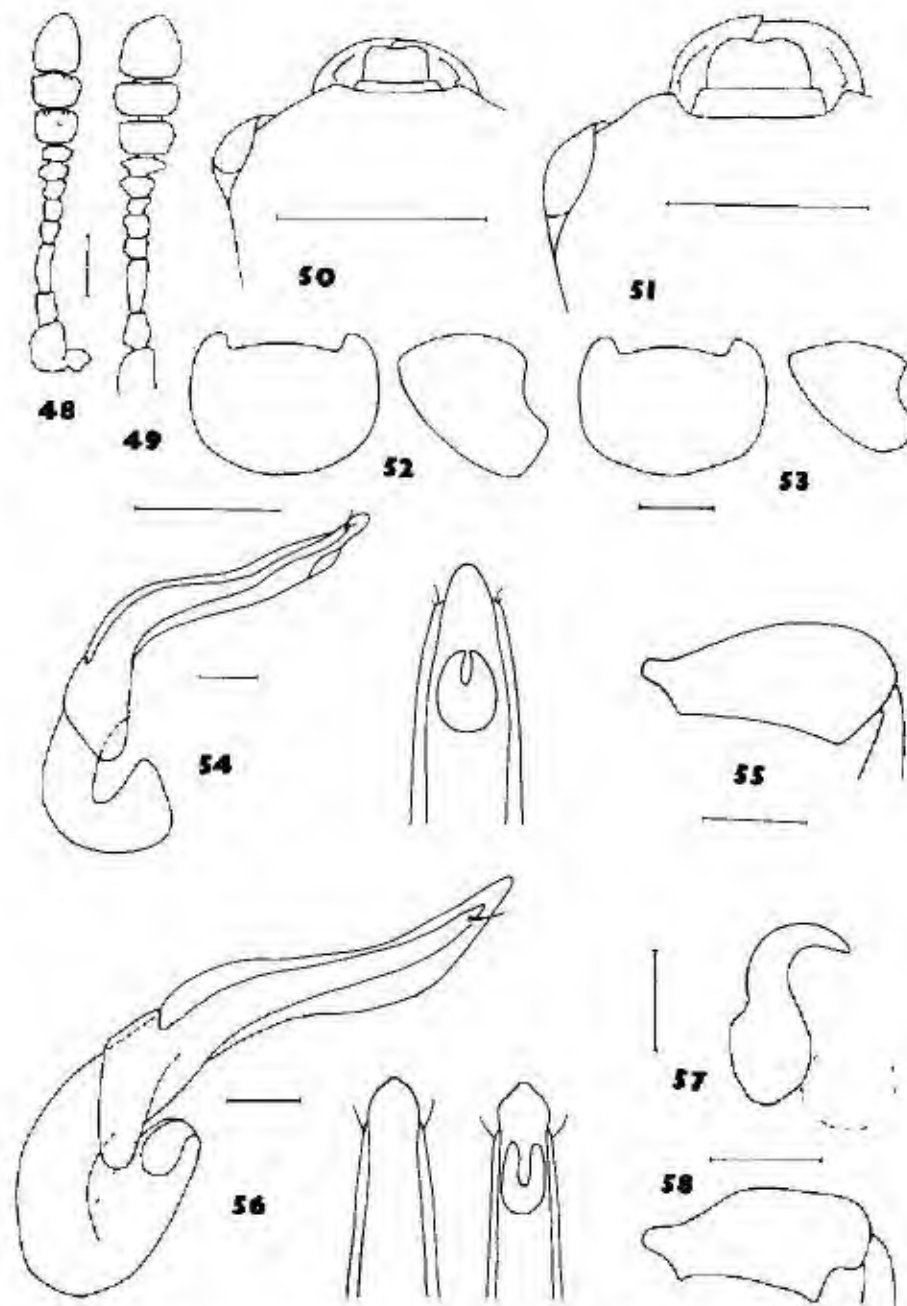
Legs. Hind femora with distal slight teeth in male (Fig. 47). Tarsal formula in male 5-5-4, in female 5-4-4.

Aedeagus. As in Fig. 45.

Spermatheca. As in Fig. 46.

DERIVATIONOMINIS. Derived from the name of the type locality.





Figs 48 - 58 Figs 48, 50, 52, 54, 55 *Agathidium (Agathidium) kepali* sp. n., Figs 49, 51, 53, 56, 57, 58 *Agathidium (Agathidium) becvaryi* sp. n. Figs 48, 49 - antenna, 50, 51 - head, 52, 53 - pronotum, 54, 56 - aedeagus, 57 - spermatheca, 55, 58 - hind femur. Scale in Figs 48, 49, 54, 55, 56, 57, 58 = 0.1 mm, in 50, 51, 52, 53 = 0.5 mm.

**DIFFERENTIAL DIAGNOSIS.** *A. alatum heishuiense* ssp. n. differs from *A. alatum alatum* Angelini & De Marzo, 1981 by clearer puncturation on dorsum, more evident traces of micro-reticulation, dark color of dorsum, shape of aedeagus with larger parameres distally and by spermatheca with longer basal part.

*Agathidium (Agathidium) kejvali* sp. n. (Figs 48, 50, 52, 54, 55)

**TYPE MATERIAL.** Holotype, male, China, Sichuan [prov.], Liziping near Shunian, 200 km SW from Yu'an, 27.vi.-3.vii. 1991, Z. Kejval leg., deposited in coll. Švec.

Length 2.7 mm, head 0.6 mm, pronotum 0.9 mm, elytra 1.2 mm, width of head 0.9 mm, pronotum 1.3 mm, elytra 1.3 mm. Height of pronotum 1.0 mm, elytra 0.9 mm. Head and pronotum dark reddish-brown, elytra black, venter reddish-brown, antennae testaceous with black club, legs reddish-brown. Without micro-reticulation, only vague traces present on elytra. Sutural striae absent.

**Head.** Punctures very small but impressed, spaced by 1 - 6 times their diameter. Clypeal anterior-lateral margin with raised bead, clypeal line absent, clypeus less excavate. Head widest just behind eyes (Fig. 50). Length ratio of 3rd/2nd antennal segments = 1.5. 3rd segment longer than 4th + 5th segments altogether (Fig. 48). Hamman's organ: gutter with one vesicle in both 9th and 10th antennal segments.

**Pronotum.** Punctures as on head, spaced by 1 - 8 times their diameter. Anterior margin slightly curved, lateral outline broadly rounded (Fig. 52).

**Elytra.** Punctures larger than those on pronotum but more superficial, separated by 1 - 10 times their diameter. Lateral outline with slight humeral angle.

**Meso- and metasternum.** Median carina present, lateral lines lacking, femoral lines incomplete and curved at midlength. Wings fully developed.

**Legs.** Hind femur with subdistal weak tooth in male (Fig. 55). Tarsal formula 5-5-4 in male, female unknown.

**Aedeagus.** As in Fig. 54.

**DERIVATION NOMINIS.** Dedicated to Ing Zbyněk Kejval, collector of the new species.

**DIFFERENTIAL DIAGNOSIS.** *Agathidium kejvali* sp. n. differs clearly from Palearctic species of the subgenus *Agathidium* s.str. by raised bead at clypeal anterior-lateral margin. From other species of madurensis group (Oriental region) it differs by head widest just behind eyes.

*Agathidium (Agathidium) becvari* sp. n. (Figs 49, 51, 53, 56, 57, 58)

**TYPE MATERIAL.** Holotype, male, China, Yunnan [prov.], Heishufu], 35 km N of Lijiang, 1.-19.vii.1992, S. Becvár leg., deposited in coll. Švec. Paratypes 2 males, 1 female, the same data, deposited in coll. Švec (1 female) and in coll. Angelini (2 male).

Length 2.6 - 2.8 mm, in holotype 2.8 mm, head 0.7 mm, pronotum 0.9 mm, elytra 1.2 mm, width of head 0.9 mm, pronotum 1.3 mm, elytra 1.3 mm, height of pronotum 0.8 mm, elytra 0.7 mm. Whole dorsum black, underside reddish-brown, antennae testaceous, black at segments 7 - 11, legs reddish-brown. Micro-reticulation absent except of vague traces on elytra. Puncturation sparse on the whole dorsum. Sutural striae lacking.

**Head.** Punctures small and moderately impressed, spaced by 1 - 4 times their diameter. Clypeal anterior - lateral margin with raised bead, clypeal line absent, clypeus moderately excavate, widest at eyes (Fig. 51). Length ratio of 3rd/2nd antennal segments = 1.5, the 3rd segment as long as 4th + 5th altogether (Fig. 49).

**Pronotum.** Punctures smaller than those on head, superficial, separated by 1 - 4 times their

diameter. Anterior margin slightly curved, lateral outline broadly rounded (Fig. 53).

Elytra. Punctures larger than those on head, superficial, separated by 1 - 3 times their diameter. Superficial and irregular furrows interposed.

Meso- and metasternum. Median carina distinct, lateral lines lacking, femoral lines incomplete, curved at mid-length. Metathoracic wings fully developed.

Legs. Hind femur with distinct subdistal tooth in male (Fig. 58). Tarsal formula in male 5-5-4, in female 5-4-4.

Aedeagus. As in Fig. 56.

Spermatheca. As in Fig. 57.

DERIVATION NOMINIS. Dedicated to Ing Stanišlav Bečvář, specialist in Tenebrionidae.

DIFFERENTIAL DIAGNOSIS. *A. bečváři* sp. n. differs from *A. kejvali* sp. n. by head widest at eyes, color of dorsum and antennal club and also by presence of traces of micro-reticulation.

*Agathidium (Agathidium) uliginosum* sp. n. (Figs 59, 61, 63, 65, 66, 67)

TYPE MATERIAL. Holotype, male, China, Yunnan [prov.], Heishui, 35 km N of Lijiang, 1-19 vii 1992, S. Bečvář leg., deposited in coll. Švec. Paratypes 3 females, the same data, deposited in coll. Švec (2 females) and in coll. Angelini (1 female).

Length 3.7 - 4.1 mm, in holotype 4.1 mm, head 0.9 mm, pronotum 1.4 mm, elytra 1.8 mm, width of head 1.2 mm, pronotum 2.1 mm, elytra 2.0 mm, height of pronotum 1.3 mm, elytra 1.0 mm. Whole dorsum black, underside reddish-brown, mesosternum paler, antennae uniformly testaceous or dark on segments 9 - 10, legs reddish-brown. Micro-reticulation present only by vague traces on head and elytra. Puncturation clear on the whole dorsum. Sutural striae superficial, extending within to the terminal fifth of elytral length.

Head. Punctures moderately strong and unpressed, spaced by 1 - 5 times their diameter. Clypeal anterior-lateral margin without raised bead. Clypeal line superficial, clypeus less excavate. Head widest at eyes (Fig. 61). Length ratio of 3rd/2nd antennal segments = 2.0, 3rd segment longer than 4th + 5th ones altogether (Fig. 59).

Pronotum. Punctures finer than on head, spaced by 3 - 6 times their diameter. Anterior margin slightly curved, lateral outline broadly rounded (Fig. 63).

Elytra. Micro-reticulation lacking, only vague traces present. Punctures separated by 2 - 3 times their diameter.

Meso- and metasternum. Median carina distinct, lateral lines complete, femoral lines incomplete. Wings lacking.

Legs. Hind femur with distal tooth in male (Fig. 67). Tarsal formula in male 5-5-4, in female 5-4-4.

Aedeagus. As in Fig. 65.

Spermatheca. As in Fig. 66.

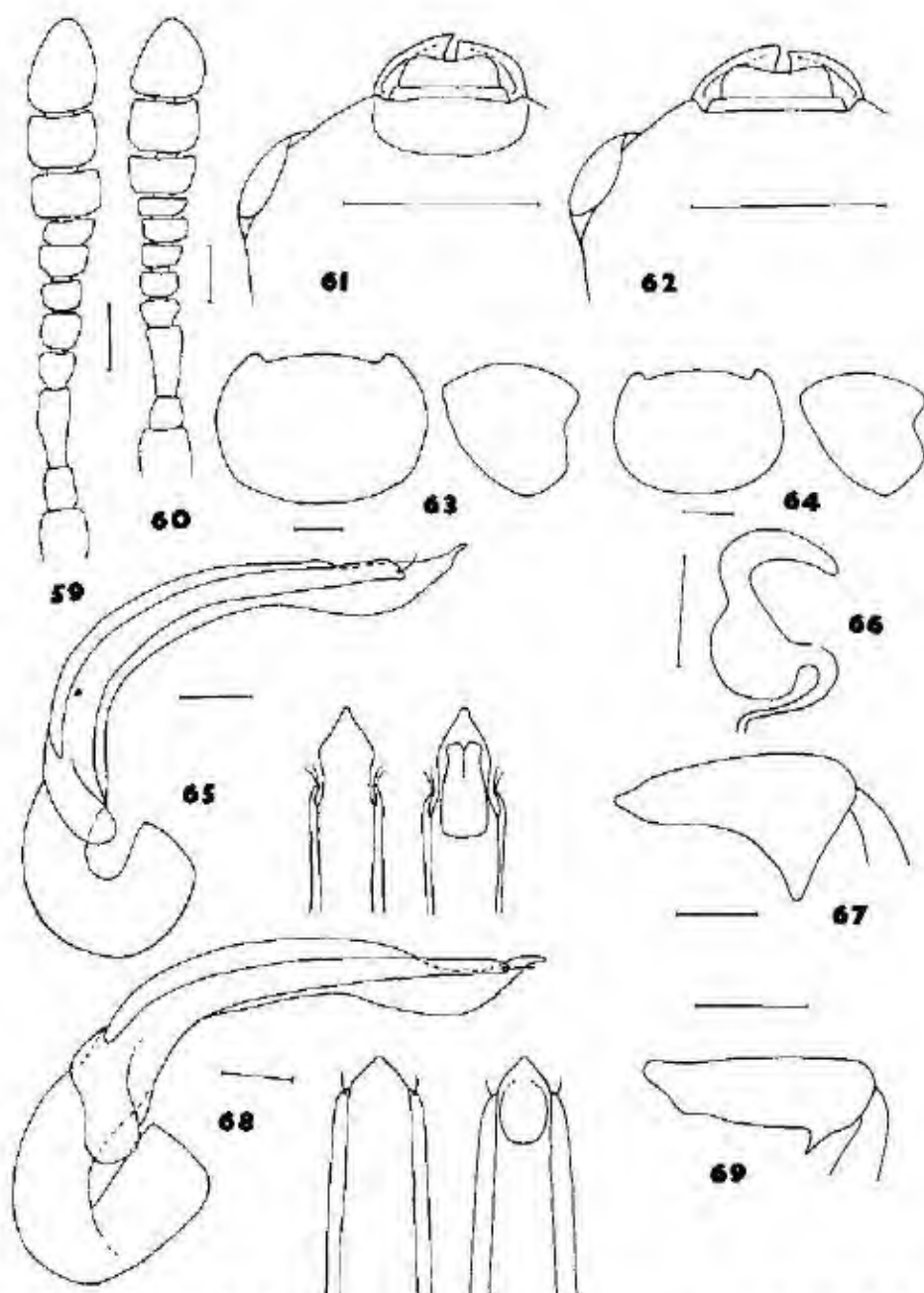
DERIVATION NOMINIS. Derived from the type of the original locality.

DIFFERENTIAL DIAGNOSIS. *A. uliginosum* sp. n. differs from similar *A. chinense* Hlissukovský, 1964 by larger size, dark color of dorsum and by lacking wings.

*Agathidium (Agathidium) yunnanicum* sp. n. (Figs 60, 62, 64, 68, 69)

TYPE MATERIAL. Holotype, male, China, Yunnan [prov.], Heishui, 35 km N of Lijiang, 1-19 vii 1992, S. Bečvář leg., deposited in coll. Švec.

Length 4.1 mm, head 1.1 mm, pronotum 1.3 mm, elytra 1.7 mm, width of head 1.3 mm.



Figs 59-69. Figs 59, 61, 63, 65, 66, 67: *Agathidium (Agathidium) uliginosum* sp. n., Figs 60, 62, 64, 68: *Agathidium (Agathidium) yunnanicum* sp. n. Figs 59, 60 - antenna, 61, 62 - head, 63, 64 - pronotum, 65, 68 - aedeagus, 66 - spermatheca, 67, 69 - hind femur. Scale in Figs 59, 60, 65, 66, 67, 68, 69 - 0.1 mm, in 61, 62, 63, 64 - 0.5 mm.

pronotum 1.7 mm, elytra 1.8 mm, height of pronotum 1.2 mm, elytra 1.0 mm. Whole dorsum black, underside reddish-brown, mesosternum paler, antennae uniformly testaceous, legs reddish-brown. Micro-reticulation absent. Puncturation clear on whole dorsum. Sutural striae absent.

**Head.** Punctures small, impressed, spaced by 1 - 4 times their diameter. Clypeal anterior - lateral margin without raised bead. Clypeal line lacking. Head widest at eyes (Fig. 62). Length ratio of 3rd/2nd antennal segments = 2.1, 3rd segment longer than 4th + 5th ones together (Fig. 60).

**Pronotum.** Puncturation as on head. Very convex. Anterior margin slightly curved, lateral outline broadly rounded (Fig. 64).

**Elytra.** Punctures 2 times as large as those on head, spaced by 0.5 - 2.0 times their diameter. Meso- and metasternum. Median carina slight, lateral lines complete, femoral lines incomplete. Wings lacking.

**Legs.** Hind femur with distinct subdistal tooth in male (Fig. 69). Tarsal formula in male 5-5-4, female unknown.

**Aedeagus.** As in Fig. 68.

**DERIVATION NOMINIS.** Derived from the provincial name of the occurring place.

**DIFFERENTIAL DIAGNOSIS.** *A. yunnanicum* sp. n. differs from similar *A. fukiense* by larger size, dark color of dorsum, uniformly colored antennal club and by lacking of wings.

#### *Agathidium (Microceble) melanarium* sp. n. (Figs 70 - 74)

**TYPE MATERIAL.** Holotype, male, China, Yunnan [prov.], Haishui, 35 km N of Lijiang, 1-19 vii 1992, S. Rečvář leg., deposited in coll. Švec.

Length 4.1 mm, head 0.9 mm, pronotum 1.4 mm, elytra 1.8 mm, width of head 1.1 mm, pronotum 1.8 mm, elytra 1.9 mm, height of pronotum 1.3 mm, elytra 1.0 mm. Whole dorsum black, underside reddish-brown, mesosternum paler, antennae testaceous, black on segments 9 - 10, legs reddish-brown. Micro-reticulation superficial on head and pronotum, more impressed on elytra. Sutural striae lacking.

**Head.** Wrinkled on clypeus. Punctures moderately large, impressed, spaced by 1 - 4 times their diameter. Clypeal anterior - lateral margin with raised bead, with short groove at each side, fovea at each side of clypeus. Eyes protuberant. Widest at eyes (Fig. 71). Length ratio of 3rd/2nd antennal segments = 1.4, 3rd segment as long as 4th + 5th altogether (Fig. 70).

**Pronotum.** Puncturation as on head, punctures separated by 2 - 5 times their diameter. Very convex. Anterior margin slightly curved, lateral outline broadly rounded (Fig. 72).

**Elytra.** Punctures larger and more impressed than those on head. Separated by 2 - 4 times their diameter. Moderately convex.

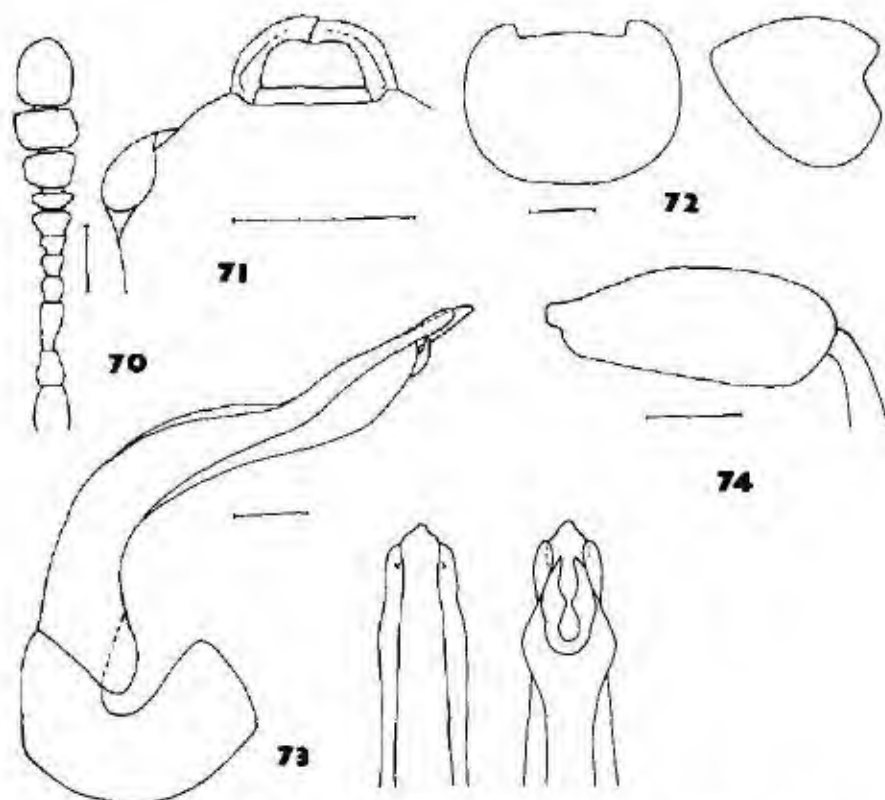
**Meso- and metasternum.** Median carina slight, lateral lines lacking, femoral lines incomplete. Wings fully developed.

**Legs.** Hind femur rounded at distal part in male (Fig. 74). Tarsal formula in male 5-5-4, female unknown.

**Aedeagus.** As in Fig. 73.

**DERIVATION NOMINIS.** Derived from the colour of dorsum.

**DIFFERENTIAL DIAGNOSIS.** *A. melanarium* sp. n. is very similar to *A. pahangense* Angelini, 1990 in more characters - black color of antennal club, micro-reticulated head, wrinkled clypeus. It differs by length ratio of 3rd/2nd antennal segments, larger size of body and by black color of dorsum.



Figs 70-74. *Agathidium (Microceble) melanarium* sp. n.. Fig. 70 - antenna, 71 - head, 72 - pronotum, 73 - aedeagus, 74 - hind femur. Scale in Figs 70, 73, 74 - 0.1 mm, in 71, 72 - 0.5 mm.

#### Tribus LEIODINI

Fourteen species of the two genera - *Leiodes* and *Cyrtusa* are known from China. The belonging of *Cyrtusa sinensis* to the genus *Cyrtusa* is doubtful. According to Daffner (1983) it is possible that this species belongs to the genus *Zeadolopus* Broun, 1902.

The thirteen species of the genus *Leiodes* known from China have following common characters: elytra lacking transverse wrinkles, elytral rows of punctures well and regularly developed, epipleurae without long and distinct setae, antennae normally long and slim, tarsal segments of usual shape. Species characterized by high ecked mesosternal carina have well developed wings. Individual characters are given in the following key.

- |   |   |                         |
|---|---|-------------------------|
| 1 | Clypeal line lacking. 7th antennal segment very short, nearly indistinct. Reddish-brown, weakly and scarcely punctate, elytra with striae. Legs short, broad, tarsi short. Length 1.5 mm. China | <i>Cyrtusa sinensis</i> |
| - | Clypeal line distinct. 7th antennal segment short, but well visible   | <i>Leiodes</i>          |
| 2 | Mesosternum with low carina as in Fig. 81   | 3                       |
| - | Mesosternum with high, ecked carina   | 13                      |



- 3 Elytra without oblique humeral rows of punctures ..... 4
- Elytra with oblique humeral rows of punctures ..... 6
- 4 Antennal club reddish-brown. Type of mesosternum A. Parameres short, reaching about mid-length of tegmen which ends in narrowly rounded tip. Oval. Length 4.5-6.5 mm. Siberia, Mongolia, China ..... *L. rufipes* 5
- Antennal club dark ..... 5
- 5 Type of metasternum B. Parameres nearly as long as tegmen, which ends in small hump at apex. Length 3.6 mm. Gansu ..... *L. nikodymi*
- Type of mesosternum A. Parameres a little shorter than tegmen ending in low emargination at the tip (Fig. 76). Length 4.2 mm. Yunnan ..... *L. curvidens* sp. n.
- 6 Odd intervals with numerous punctures larger as those in rows. Type of mesosternum B. Head and pronotum finely and densely punctured. 3.2-5.0 mm. Europe, Siberia, Mongolia, Sichuan ..... *L. lucens* 7
- Odd elytral intervals with several punctures smaller or as large as those in rows ..... 7
- 7 Last antennal segment at most a little narrower than the previous one. Type of mesosternum A ..... 8
- Last antennal segment distinctly narrower than the previous one. Type of mesosternum B ..... 11
- 8 Pronotum finely and densely punctate, its lateral margins parallel in basal half. Interval punctures of elytra small and scarce ..... 9
- Pronotum strongly and densely punctate, its lateral margins slightly tapered from midlength to basis. Intervals of elytra with dense and fine punctures. Type of mesosternum A. Top of tegmen broadly rounded. Oval. Length 2.5-3.8 mm. Europe, N. Africa, Afghanistan, Mongolia, Siberia, Gansu, Xinjiang ..... *L. bicolor*
- 9 Elytral margins nearly straight at anterior half. Oblong oval. Apex of tegmen narrowly rounded. Type of mesosternum A ..... 10
- Elytral margins rounded. Apex of tegmen with small hump. Length 3.0-4.0 mm. Europe, Caucasus, E. Siberia, Gansu ..... *L. ferruginea*
- 10 Last antennal segment a little narrower than the previous one. Femur without any tooth in male. Sides of tegmen straightly tapered to tip. Length 2.8-4.0 mm. Siberia, Mongolia, Gansu, Canada ..... *L. dilutipes*
- Last antennal segment as wide as the previous one. Femur with tooth at midlength of hind margin. Sides of tegmen slightly emarginate before tip (Fig. 79). Length 3.7 mm. Xinjiang ..... *L. snizeki* sp. n.
- 11 Pronotum densely and finely punctate ..... 12
- Pronotum sparsely and very finely punctate, widest at basis, hind angles rectangular, broadly rounded. Hind femora without tooth in male. Aedeagus stout with narrowed protuberant process at apex (Fig. 83). Length 3.0-3.1 mm. Gansu ..... *L. chinensis* sp. n.
- 12 Lateral sides of pronotum straight at basal half. Aedeagus slightly emarginated before narrowly rounded tip (Fig. 82). Length 3.4 mm. Sichuan ..... *L. alexandrae* sp. n.
- Lateral sides of pronotum roundly narrowed anteriorly. Aedeagus with small bump at tip (Fig. 84). Length 2.8 mm. Yunnan ..... *L. beccari* sp. n.
- 13 Pronotum finely distinctly punctate. Aedeagus widely rounded at tip (Fig. 85). Length 2.1-2.3 mm. Xinjiang ..... *L. jaroslavi* sp. n.
- Pronotum nearly impunctate. Aedeagus narrowly rounded at tip (Fig. 86). Length 2.5 mm. Xinjiang ..... *L. xinjiangensis* sp. n.

*Leiodes curvidens* sp.n. (Figs 75 - 78)

TYPE MATERIAL. Holotype, male, China, Yunnan prov, Heishui, 35 km N of Lijiang, 27.13 N, 100.19 E, 19.vi.-4.vii.1993, S. Bešvák leg., deposited in coll. Švec.

Length 4.2 mm, head 0.6 mm, pronotum 1.1 mm, elytra 2.5 mm, antenna 1.2 mm, width of head 1.1 mm, pronotum 2.0 mm, elytra 2.3 mm. Reddish-brown, antennae yellowish, club black.

Head. Distinctly densely punctate, punctures separated by 0.5 - 1.0 times their diameter. Five large punctures arranged at front. Two of them at one side of head, three ones at opposite side. Last antennal segment distinctly narrower than the previous one. Ratio of width antennal segments 10/11 = 1.25.

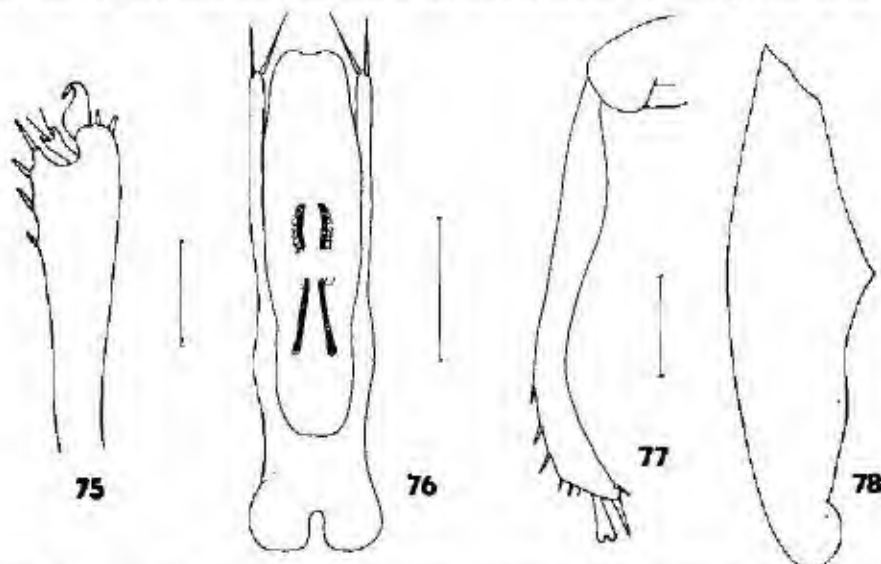
Pronotum. Punctuation dense and distinct, punctures separated by 1 - 2 times their diameter.

Some smaller ones interposed. Basis distinctly emarginate before hind rectangular angles. Widest at basis. Lateral sides slightly emarginate just before hind angles in lateral view.

Elytra. With slight micro-reticulation. Without oblique humeral rows of punctures. Punctures of elytral rows densely arranged, separated by 0.25 - 0.50 times their diameter, those occurring in odd intervals of the same size. Intervals distinctly densely punctate, punctures spaced by about 2 times their diameter. Epipleurae without setae. Surface without wrinkles. Wings fully developed.

Mesosternum. Type A.

Legs. Anterior tibiae about 2.5 times as wide at apex as at basis. 1st - 3rd segments of anterior 4 tarsi dilated. Anterior tibiae ends in two hooked thorns at inner edge. One of them very



Figs 75-78. *Leiodes curvidens* sp. n. Fig. 75 - anterior tibia in male, 76 - aedeagus, 77 - hind tibia in male, 78 - hind femur in male. Scale = 0.2 mm.

dilated and of unusual shape (Fig. 75). Hind femur with tooth at ventral side of hind edge placed at the basal third of length (Fig. 78). Hind tibiae double curved (Fig. 77).

Aedeagus. As in Fig. 76.

DERIVATION NOMINIS. Derived from the shape of the distal thorns of anterior tibiae.

DIFFERENTIAL DIAGNOSIS. *Leiodes curvidens* sp. n. differs from similar *L. major* (Portevin, 1926) by hooked distal thorns of anterior tibiae. From all known palaeartic species of the subgenus it differs by shallowly emarginate tip of aedeagus.

*Leiodes lucens* (Fairmaire, 1855)

*Anisotoma lucens* Fairmaire, 1855: 76

*Leiodes lucens*, Dallner, 1983: 71

MATERIAL EXAMINED. 1 male, China, Sichuan [prov.], Kangding [distr.], 2700 m [above sea level], 13.-15.vii.1992, J. Schneider leg. Deposited in coll. Švec.

Tip of tegmen rounded in the specimen examined, while it is cut in European specimens. New for China.

*Leiodes bicolor* (Schmidt, 1841)

*Anisotoma bicolor* Schmidt, 1841: 170-171

*Leiodes bicolor*, Daffner, 1983: 96

MATERIAL EXAMINED: Male, China, Gansu prov., 120 km SW from Lanzhou, Ponggartang, 30 vi-2 vii 1992, J Turna leg., female, China occ., [Xinjiang auton. reg.], Tian Shan Mts., Fukang, Urumqi, 42 km Sevenly Lake, Bogda Shan [Mts.], 14 vi 1991, M Snížek leg., female, China, N. Sichuan [prov.], 30 km W from Nanping, Jushatgou, 3100 m [above sea level], 13-15 vi 1992, J Turna leg., depos. in coll. Švec

Specimens examined agree well to those occur in Europe. Confirmed occurrence in China.

*Leiodes dilutipes* (J Sahlberg, 1903)

*Leiodes dilutipes* J Sahlberg, 1903: 14-15

*Leiodes dilutipes*, Daffner, 1983: 99-100

MATERIAL EXAMINED: 1 male, 2 females, China occ., [Xinjiang auton. reg.], Tian Shan [Mts.], Urumqi, 70 km from Houxia, 2000-3000 m [above sea level], 16-21 vii 1991, M Snížek leg. Deposited in coll. Švec

Specimens examined are reddish-brown colored, other characters are typical. Confirmed occurrence in China.

*Leiodes snizeki* sp. n. (Figs 79, 80)

TYPE MATERIAL: Holotype: male, China occ., [Xinjiang auton. reg.], Bogda Shan [Mts.], Urumqi, 61 km [far from] Fukang, 47 km [far from] Sevenly Lake, 14 vii 1992, M Snížek leg., deposited in coll. Švec

Length 3.7 mm, head 0.4 mm, pronotum 1.0 mm, elytra 2.3 mm, antenna 1.1 mm, width of head 0.9 mm, pronotum 1.9 mm, elytra 2.1 mm. Reddish-brown, tarsi and antennae yellowish, antennal club dark.

Head: Distinctly, densely punctate, punctures separated by 2 times of their diameter. Four large punctures arranged at the level of hind margin of eyes. Last antennal segment as wide as the previous one.

Pronotum: Finer and scarcer punctured than on head, punctures separated by 4-5 times of their diameter. Just before hind margin with row of large punctures. Basis straight, hind angles slightly obtuse, broadly rounded. Widest just before basis, posterior half of lateral outlines straight, the anterior one slightly rounded and tapered toward head dorsally seen. Lateral sides nearly straight from midlength toward basis with slight emargination before hind angles in lateral view.

Elytra: With oblique humeral row of punctures. Punctures of elytral rows large, densely arranged, spaced by 0.5-1.0 times their diameter, those occurring in odd intervals a little smaller. Intervals with very small, rare punctures of two sizes. Without wrinkles, epipleurae without setae.

Wings fully developed.

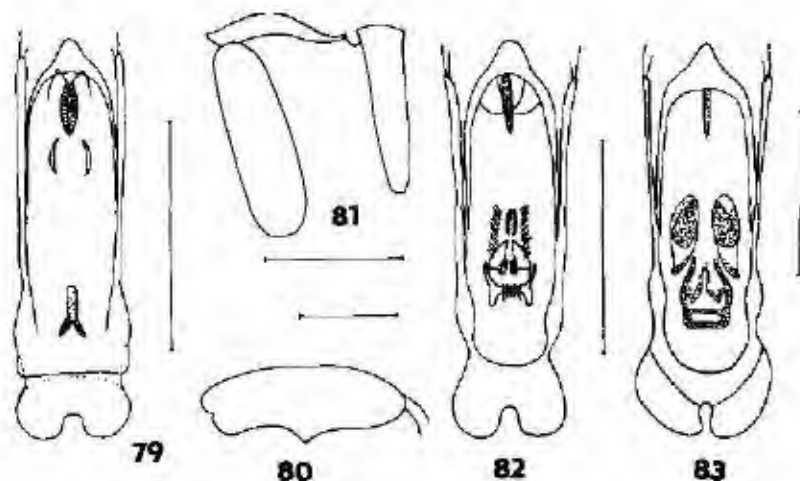
Mesosternum: Type A.

Legs: Anterior tibiae about 2.5 times as wide at apex as at basis. 1st-3rd segments of anterior 4 tarsi slightly dilated. Hind femora with two emarginations at posterior margin forming small, obtuse but distinct tooth at midlength (Fig. 80). Outer margins of hind tibiae simply slightly bent, nearly indistinctly double curved in male.

Aedeagus: As in Fig. 79.

DERIVATIO NOMINIS: Dedicated to Ing. M. Snížek, entomologist from České Budějovice.

DIFFERENTIAL DIAGNOSIS: *Leiodes snizeki* sp. n. is very similar to *L. dilutipes*. From this species it differs by broad last antennal segment which is as broad as the previous one, by emargination before tip of aedeagus and by the shape of endophallus.



Figs 79-83. Figs 79, 80: *Leiodes snizeki* sp. n. Fig. 79 - aedeagus, 80 - hind femur. Figs 81, 82: *Leiodes alexandrae* sp. n. Fig. 81 - mesosternal carina, 82 - aedeagus. Fig. 83: *Leiodes chinensis* sp. n., aedeagus. Scale in Figs 79, 81, 82, 83 - 0.5 mm, in 80 - 0.2 mm.

*Leiodes chinensis* sp. n. (Fig. 83)

TYPE MATERIAL. Holotype, male, China, Gansu prov., 120 km SW [from] Lanzhou, Ponggartang, 30.vi.-2.vii.1992, J. Tuma leg., paratype, 1 male, the same data. Deposited in coll. Švec.

Length 3.0-3.1 mm, in holotype 3.0 mm, head 0.2 mm, pronotum 1.0 mm, elytra 1.8 mm, antenna 1.0 mm, width of head 0.8 mm, pronotum 1.6 mm, elytra 1.6 mm at basis, 1.8 mm at the 1st third of length. Brown-black, underside dark brown, antennae yellowish-red, club black, legs reddish-brown.

Head. Finely and scarcely irregularly punctate, punctures spaced by 2 - 7 times of their diameter. Four large punctures at hind level of eyes. Last antennal segment a little narrower than the previous one.

Pronotum. Punctures very fine, small, irregularly distributed, separated by 4 - 8 times of their diameter. Just before basis with row of some large punctures. Widest at basis, toward anterior margin tapered, hind half of lateral margins straight, from midlength slightly rounded dorsally seen. Hind angles rectangular rounded. Lateral margin straight at posterior half in lateral view. Basis straight.

Elytra. With oblique row of punctures at humeral part. Punctured rows of elytra with small, fine punctures spaced by 4-8 times of their diameter. Several punctures as large as those in rows distributed in rows in odd intervals. Some interval punctures very fine and scarce, without oblique wrinkles. Widest about at the 1st third of length. Epipleurae without setae. Wings fully developed.

*Mesosternum*. Type B.

Legs. Anterior tibiae narrow, twice as broad at apex as at basis. Segments 2nd and 3rd of anterior four tarsi slightly dilate, hind femora without striking characters, hind tibiae slightly double curved in male.

Aedeagus. As in Fig. 83.

DERIVATION NOMINIS. Derived from the country of origin.

DIFFERENTIAL DIAGNOSIS *Leiodes chinensis* sp. n. is morphologically close to *L. klapperichi* Daffner, 1983 and *L. alexandrae* sp. n. It differs from the both species by much more sparsely punctate pronotum, from *L. klapperichi* by dark colour and from *L. alexandrae* before all by the characteristic shape of endophallic sculptures.

*Leiodes alexandrae* sp. n. (Figs 81, 82)

TYPE MATERIAL. Holotype, male, China, Sichuan prov., [Kangding distr., Hailougou Glacier Park], Gongga Shan Mts., Moxi [vill.], 21-24 vii 1992, J. Schneider leg., deposited in coll. Švec.

Length of body 3.4 mm, head 0.5 mm, pronotum 0.8 mm, elytra 2.1 mm, antenna 1.0 mm, width of head 0.8 mm, pronotum 1.5 mm, elytra 1.6 mm.

Black, margins of pronotum narrowly reddish, appendages yellowish-red except of dark antennal club. Underside brownish-black.

Head. Distinctly punctate, punctures separated by 1 - 3 times of their diameter with four large punctures on vertex just before the level of hind margins of eyes. Temporalae with oblique micro-sculpture. Last antennal segment distinctly narrower than the previous one.

Pronotum. Finely but distinctly punctate, punctures spaced by 2 - 4 times of their diameter. Before hind margin with row of large punctures. Hind angles rounded, nearly rectangular, lateral margins conically narrowed anteriorly in dorsal view. In lateral view hind angles obtuse, rounded, lateral margins straight till midlength then slightly rounded anteriorly. Straight posterior half of lateral margins slightly emarginate before hind angles laterally seen.

Elytra. Rows of punctures fine but distinct, dense punctures separated by 0.5 - 1.5 times of their diameter. Intervals distinctly and rather densely double punctate, punctures spaced by about 4 times of their diameter. Odd intervals with large punctures as large as those in rows. Epipleurae without setae. With short oblique humeral rows. Without wrinkles. Wings fully developed.

Mesosternum. Carina high. Type B, as in Fig. 81.

Legs. Anterior tibiae nearly 3 times as wide at apex as at basis. The 2nd-4th tarsal segments of the 1st and 2nd pair of legs slightly but distinctly dilate, hind tibiae twice wooleed, at distal third strongly medially bent. Femora without any tooth in male.

Aedeagus. As in Fig. 82.

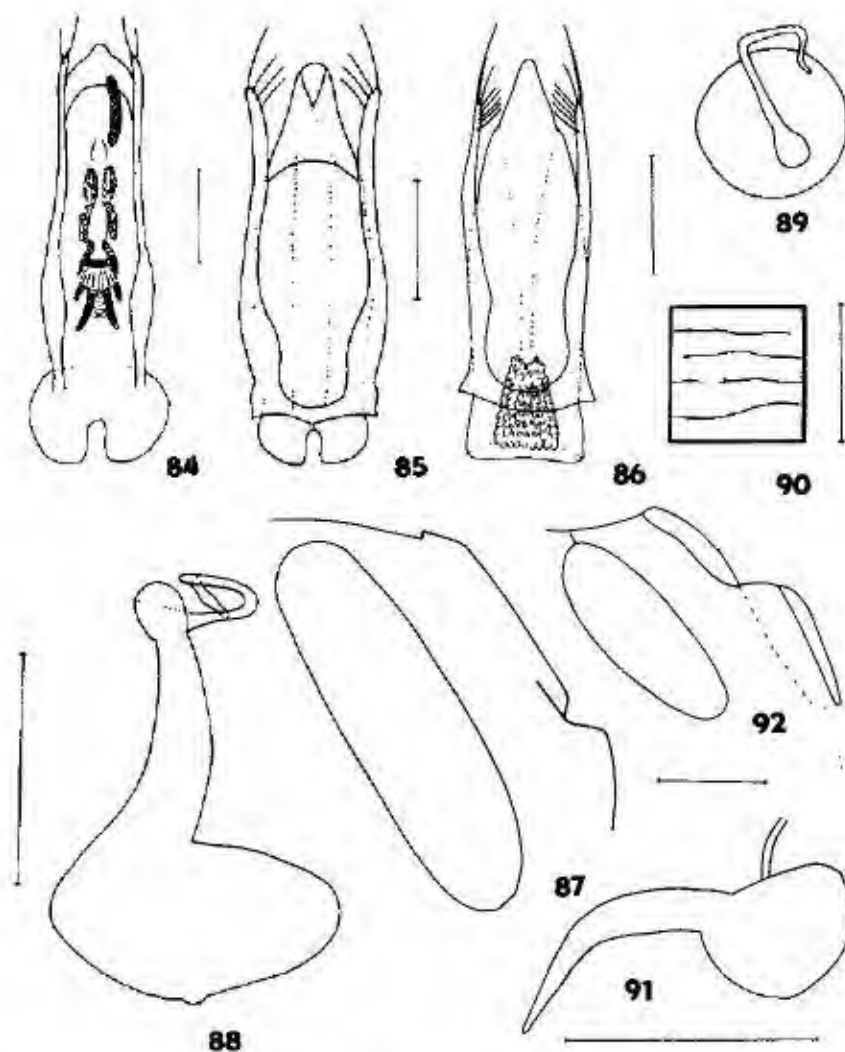
DERIVATION NOMINIS. According to wish of the collector of this new species dedicated it to his girlfriend Alexandra Křřžová.

DIFFERENTIAL DIAGNOSIS *Leiodes alexandrae* sp. n. is very similar to *L. klapperichi* Daffner 1988 and *L. chinensis* sp. n. From *L. klapperichi* it differs by dark color while the similar species is yellowish-brown and by more scarcerly distributed punctures in elytral rows, from *L. chinensis* it differs by more densely punctate pronotum. From both mentioned species it differs by striking shaped endophallus having two backward standing processes.

*Leiodes becvári* sp. n. (Fig. 84)

TYPE MATERIAL. Holotype, male, China, Yunnan [prov.], Heishu, 35 km N of Lijiang, 127°13' N, 100°19' E, 1-19 vii 1992, S. Bečvář leg., deposited in coll. Švec.

Length 2.8 mm, head 0.5 mm, pronotum 0.7 mm, elytra 1.6 mm, antenna 0.8 mm, width of



Figs 84-92. Fig. 84: *Leiodes becvari* sp. n., aedeagus. Fig. 85: *Leiodes jaroslavi* sp. n., aedeagus. Fig. 86: *Leiodes xijiangensis* sp. n., aedeagus. Scale = 0.2 mm. 87-90: *Colenisia pecki* Daffner, Fig. 87 - mesosternal carina, 88, 89 - spermatheca, 90 - micro-sculpture of elytra. Scale = 0.1 mm. 91-92: *Colenisia similata* sp. n. Fig. 91 - spermatheca, Fig. 92 - mesosternal carina. Scale = 0.2 mm.

head 0.7 mm, pronotum 1.4 mm, elytra 1.5 mm. Chestnut brown, appendages yellowish-brown except of dark antennal club. Underside reddish-brown.

Head. Distinctly punctate, punctures separated by 2.5 - 3.0 times their diameter with 4 large punctures on vertex. Last antennal segment slightly narrower than the previous one.

Pronotum. Micro-reticulate. Distinctly punctate, punctures a little smaller than those on



head, separated by 3 - 4 times of their diameter. Some larger ones distributed at hind angles and before basis. Hind angles nearly rectangular, slightly rounded. Lateral margins roundly narrowed anteriorly in dorsal view. In lateral view hind angles shortly rounded, lateral margins rounded, before hind angles very slightly concave. Pronotum widest at basis.

Elytra. Rows distinct, fine, punctures separated by about 1.5 - 2.0 times their diameter. Odd intervals with punctures as large as those in rows. Intervals distinctly but finely punctate, punctures spaced by about 2 - 3 times their diameter. Epipleurae without setae. With short oblique humeral rows. Without wrinkles. Wings fully developed.

Mesosternum. Carina similarly developed as that in *L. alexandrae* sp. n. Type B.

Legs. Anterior tibiae about twice as broad before apex as at basis. 2nd - 4th tarsal segments of 1st and 2nd pair of legs slightly dilate. Hind tibiae without any tooth in male.

Aedeagus. As in Fig. 84.

DERIVATIO NOMINIS. Dedicated to the collector of the species, Ing Stanislav Bečvář.

DIFFERENTIAL DIAGNOSIS. *Leiodes becvari* sp. n. is very similar to *L. klapperichi* and *L. chinensis* sp. n. From *L. klapperichi* it differs by sparse arranged punctures of elytral rows, from *L. chinensis* sp. n. by much more distinctly punctate pronotum. From both species it differs also by the shape of genitalia.

*Leiodes jaroslavi* sp. n. (Fig. 85)

TYPE MATERIAL. Holotype, male, China [occ.], Xinjiang [auton. reg.], S slope of Tian Shan mts. road Kuqa - Bayanbulak, ca 100 km NNE Kuqa, 2000 - 3000 m [above sea level], 8.-11.v.1993. J. Tuma leg. Paratypes, 2 males, the same data. Holotype and 1 paratype deposited in coll. Švec, 1 paratype deposited in coll. Tuma.

Length 2.1 - 2.3 mm, in holotype 2.2 mm, head 0.2 mm, pronotum 0.6 mm, elytra 1.4 mm, antenna 0.7 mm, width of head 0.6 mm, pronotum 1.2 mm, elytra 1.3 mm. Reddish-brown, antennae yellowish-brown, club infusate.

Head. Irregularly finely punctate, punctures spaced by 5 - 10 times their diameter. On vertex 1 - 4 large punctures. Last antennal segment distinctly narrower than the previous one. Ratio of 10/11 segments = 1.29.

Pronotum. Finely but distinctly punctate, rather finer than on head. At straight basis widest. Hind angles widely rounded.

Elytra. With distinct rows of punctures, those separated by 1.5 times their diameter. A little smaller ones distributed in odd intervals. Each elytral interval with irregular row of small, very fine and minutous punctures.

Wings fully developed.

Mesosternum. With high edged carina.

Legs. 1st to 3rd segments of anterior tarsi slightly dilate. Hind femora simple, hind tibiae simply slightly curved.

Aedeagus. As in Fig. 85.

DERIVATIO NOMINIS. Name derivated from the first name of the collector of the new species, Mr Jaroslav Tuma.

DIFFERENTIAL DIAGNOSIS. *L. jaroslavi* sp. n. differs from very similar *L. subtilis* (Reitter, 1885) by last antennal segment distinctly narrower than the previous one which is only a little broader than the last one in *L. subtilis*. The new species differs also by the shape of aedeagus.

*Leiodes xinjiangensis* sp. n. (Fig. 86)

TYPE MATERIAL. Holotype, male, China [occ.], Xinjiang [autonom. region], ca 140 km SSW Yecheng, W Kunlun Shan, 50 km S Aqineqit, 2500 m [above sea level], 26.vi.1993, J. Tuma leg. Paratype, 1 male, the same data. Deposited in coll. Švec.

Length 2.4 - 2.5 mm, in holotype 2.5 mm, head 0.3 mm, pronotum 0.7 mm, elytra 1.5 mm, antenna 0.8 mm, width of head 0.7 mm, pronotum 1.3 mm, elytra 1.4 mm. Reddish-brown, antennae yellowish-brown, club infusate.

Head. Sparsely and finely punctate. Punctures small and superficial, spaced by 2 - 8 times their diameter, 4 large punctures at hind level of eyes. Last antennal segment a little narrower than the previous one. Ratio of width of 10th/11th segments = 1.1.

Pronotum. Punctuation rare, fine, superficial, nearly indistinct. Punctures spaced by 5 - 7 times their diameter. Pronotum widest at straight basis. Hind angles broadly rounded.

Elytra. Without wrinkles. Rows of punctures distinct, punctures arranged by 1 times of their diameter. Large punctures, nearly as large as those in rows distributed in odd intervals. Intervals sparsely punctate, punctures small and sparse, separated by 5 - 8 times of their diameter. Epipleurae with short rare setae.

Mesosternum. With high, ecked carina.

Legs. 1st to 3rd segments of the anterior tarsi slightly dilate. Hind femora simple, hind tibiae simply slightly curved.

Male genitalia. As in Fig. 86.

DERIVATIO NOMINIS. Derived from the regional name of the part of the country.

DIFFERENTIAL DIAGNOSIS. *L. xinjiangensis* sp. n. differs from similar *L. bengalica* Daffner, 1986 by dark club of antennae and by a little narrower last antennal segment which is as broad as the previous one in *L. bengalica*. Also the shape of aedeagus is quite different.

Tribus PSEUDOLIODINI

Two genera - *Colenisia* and *Pseudcolenis* occur in China. Known species are keyed below.

- |   |  |                              |
|---|--|------------------------------|
| 1 | Antennal club 5 segmented, stout. Segments 7th to 10th dilated, as wide or wider than long (Fig. 96). Mesosternum pull out forward forming process between coxae. Carina falls abruptly - <i>Colenisia</i> . . . . . | 2                            |
| - | Antennal club 5 or 6 segmented, slim. At least segments 9th and 10th longer than wide - <i>Pseudcolenis</i> . . . . .  | 3                            |
| 2 | Outline of mesosternal keel straight (Fig. 87). Punctuation of elytra weak, slightly visible. Length 2.8 mm. Japan, Sichuan . . . . .  | <i>Colenisia pecki</i>       |
| - | Outline of mesosternal keel rounded (Fig. 98). Punctuation of elytra distinct, well visible. Yunnan . . . . .  | <i>C. similata</i> sp. n.    |
| 3 | Elytra smooth without strigosities, punctures arranged in rows. Length 2.5-2.8 mm. India, Yunnan . . . . .   | <i>Pseudcolenis bouvieri</i> |
| - | Elytra finely, densely, distinctly strigose, elytral punctures form at most traces of rows on disc. Length 1.7 - 2.1 mm. Corea, China, Japan . . . . .   | <i>P. hilleri</i>            |

*Colenisia pecki* Daffner, 1988 (Figs 87 - 90)

MATERIAL EXAMINED. Female, China, Sichuan [prov.], 50 km NW [from] Chengdu, Guan Xian, 21.-25.vi.1992, J. Tuma leg., deposited in coll. Švec.

The specimen examined agrees with the original description of the species except of longer last antennal segment and some differences in the shape of spermatheca.

*Colenisia simulata* sp.n. (Figs 91, 92)

TYPE MATERIAL. Holotype, female, China, Yunnan prov., Heishui, 35 km N Lijiang, 27°13' N, 100°19' E, 18 vi - 4 vii 1993, S. Bervar leg.

Length 1.9 mm, head 0.3 mm, pronotum 0.5 mm, elytra 1.1 mm, antenna 0.5 mm, width of head 0.6 mm, pronotum 1.1 mm, elytra 1.1 mm. Head and pronotum chestnut colored, elytra reddish-brown, paler. Antennae yellowish-brown, club dark.

Head. Distinctly transversely micro-reticulate, scarcely punctate. Punctures spaced by 3 - 5 times their diameter. Clypeal line weakly impressed, behind it 2 large punctures. Last antennal segment distinctly narrower than the previous one.

Pronotum. Strigose as on head. Punctures of 2 sizes. The smaller ones separated by 3 - 4 times their diameter, some larger ones interposed. Widest at basis, hind angles obtuse, shortly rounded in lateral view.

Elytra. With oblique, distinctly impressed stigosites connecting well visible punctures rather arranged in rows. Sutural striae reach about mid-length of elytra. Membranaceous wings fully developed.

Mesosternum. Prolongate far anteriorly with abruptly fallen carina slightly rounded at outline (Fig. 92).

Legs. Anterior tibiae slim and straight with distinct terminal and 2 - 3 weak lateral spurs and some setae. Middle tibiae broader with numerous spines, the hind ones with several long thin thorus. Claws without denses.

Male genitalia. Unknown.

Female genitalia. Spermatheca as in Fig. 91, with sphaerical basal part and long, simply curved process.

DERIVATIONOMINIS. Named according to the similarity to *C. pecki*.

DIFFERENTIAL DIAGNOSIS. *Colenisia simulata* sp.n. is similar to *C. pecki*. It differs from the mentioned species beside the shape of spermatheca by strongly punctate elytra.

*Pseudocolenis bouvieri* (Portevin, 1903)

*Delias bouvieri* Portevin 1903: 335-336.

*Pseudocolenis bouvieri* Daffner, 1988: 157.

MATERIAL EXAMINED. 1 male, China, Sichuan, Laziping, Shunan, 200 km SW from Yaan, 27 vi - 3 vii 1991, Z. Kejval leg., further 2 males, China, Yunnan [prov.], Heishui, 35 km N of Lijiang, 127°13' N, 100°19' E, 19 vii 1992, S. Bervar leg., deposited in coll. Svec.

New for China.

Tribe SOGDINI

Two species belonging to two genera are known from China.

1. Antennal club 3 segmented. Head finely, scarcely punctate. Aedeagus with small bump at apex, parameres as long as aedeagus. Length 2.2-2.7 mm. Central Asia, Siberia, Mongolia, China. *Stereus hamatus*
- Antennal club 5 segmented. The last segment slightly narrower than the previous one. Pronotum with distinct hind angles. Body oval. Length 2.1-2.9 mm. N Europe, Siberia, Mongolia, Xinjiang, Canada. *Hydnobius tibialis*

*Hydnobius tibialis* J. Sahlberg, 1903

*Hydnobius tibialis* J. Sahlberg, 1903: 9-10, Daffner, 1983: 32.

MATERIAL EXAMINED. 4 males, 3 females, China occ., [Xinjiang autonomous region], Tian Shan [Mts], Urumqi, 70 km [from] Houtai, 2000-3000 m [above sea level], 16-21 vii 1991, M. Snížek leg., deposited in coll. Svec.

## List of Chinese Leiodinae

### Tribus AGATHIIDINI Westwood, 1838

#### *Anisotoma* Panzer, 1797

<i>kali</i> sp. n.	Yunnan
<i>atra</i> sp. n.	Yunnan
<i>beckari</i> sp. n.	Yunnan
<i>dundai</i> sp. n.	Sichuan
<i>curta</i> (Portevin, 1927)	Sichuan
<i>schneideri</i> sp. n.	Sichuan

#### *Cyrtoplastus* Reitter, 1884

<i>chinensis</i> sp. n.	Sichuan
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#### *Stetholodes* Fall, 1910

<i>nanai</i> sp. n.	Sichuan
<i>chinense</i> sp. n.	Gansu

#### *Agathidium* Panzer, 1797

##### subg. *Neoceble* Gozis, 1886

<i>dundai</i> sp. n.	Sichuan
<i>unicolorum</i> Angelini & De Marzo, 1984	Fujian
<i>benzi</i> Angelini & De Marzo, 1984	Fujian

##### subg. *Agathidium* s. str.

<i>ulatum heishuiense</i> sp. n.	Yunnan
<i>chinense</i> Illisnikovskiy, 1964	Sichuan
<i>keyali</i> sp. n.	Sichuan
<i>beckari</i> sp. n.	Yunnan
<i>uliginosum</i> sp. n.	Yunnan
<i>fukiense</i> Angelini & De Marzo, 1984	Fujian
<i>yunnanicum</i> sp. n.	Yunnan

##### subg. *Microceble* Angelini & De Marzo, 1986

<i>melanarium</i> sp. n.	Yunnan
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### Tribus LEIODINI Fleming, 1821

#### *Leiodes* Latreille, 1802

<i>bicolor</i> (Schmidt, 1841)	Gansu, Xinjiang, Sichuan
<i>dilatipes</i> (J. Sahlberg, 1903)	Gansu
<i>feruginea</i> (Fabricius, 1787)	Gansu
<i>rufipes</i> (Gehler, 1833)	China
<i>nikodymi</i> Svec, 1991	Gansu
<i>lucens</i> (Lammarre, 1855)	Sichuan
<i>suizeki</i> sp. n.	Xinjiang
<i>chinensis</i> sp. n.	Gansu
<i>alexandrae</i> sp. n.	Sichuan
<i>beckari</i> sp. n.	Yunnan
<i>curvidens</i> sp. n.	Yunnan
<i>proslavi</i> sp. n.	Xinjiang
<i>xinjiangensis</i> sp. n.	Xinjiang

#### *Cyrtusa* Erichson, 1842

<i>sinensis</i> Portevin, 1942	China
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### Tribus PSEUDOLIODINI Portevin, 1926

#### *Pseudolenis* Reitter, 1884

<i>hainanensis</i> (Portevin, 1903)	China
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<i>hilleri</i> Reitter, 1885	China
<i>Colenistia</i> Fautvel, 1903	
<i>pecki</i> Daffner, 1988	Sichuan
<i>similata</i> sp.n.	Yunnan
Tribus SOGDINI Lopatin, 1961	
<i>Hydnobius</i> Schmidt, 1841	
<i>tibialis</i> J. Sahlberg, 1903	"Tukang"
<i>Stereus</i> Wollaston, 1857	
<i>hamatus</i> J. Sahlberg, 1886	China

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## BOOK REVIEW

GUTIERREZ Y. *Diagnostic Pathology of Parasitic Diseases with Clinical Correlations*. Lea & Febiger, Philadelphia, London 1990. VIII + 532 pages. Format 180 x 260 mm. Price hardcover \$ 75.00 or Lstg 47.50. ISBN 0-8121-1237-1.

The author, a pathologist interested in parasitic diseases, is Associate Professor at the University of Cleveland, Ohio.

As explained in the preface, this book was written in the old fashioned way – a single author toiling along for several years and exploring the literature published during the last 100 years. Evidently, there is a contrast to the conception of many modern handbooks requiring a teamwork of several dozens of contributors to bring together the amount of information of similar extent. The volume is organized into six parts consisting of 32 chapters in all. Individual parts are arranged in accordance with principles of taxonomic classification in zoology. Each of the first five parts covers a particular group (subkingdom, subphylum, class) of parasitic organisms.

The first chapter is intended to give an introduction to general terms in parasitology. Part one (10 chapters) deals with the protozoa. Introductory chapter characterizes the morphology, life cycles, reproduction, and classification of protozoan parasites in general. Particular protozoan groups follow when discussing the morphology of the agent, clinical and pathological correlations and pathomorphological diagnosis. In following chapters listed are intestinal and urogenital flagellates, blood and tissue flagellates, intestinal and free-living amoebae, intestinal, tissue and blood apicomplexans, microspores, and ciliates.

Following three parts (12 chapters) provide insights into the helminths. In each part, introductory chapters discuss the structure of adult and larval forms, life cycles, classification and geographic distribution. The part on nematodes is concerned with following orders: Rhabditida, Strongylida, Oxyurida, Ascandida and Spirurida. The chapters dealing with trematodes cover intestinal, pulmonary, biliary and pancreatic, and blood vessels flukes (schistosomes). The chapter on cestodes (tapeworms) focuses on cysticercosis, coenitrosis and sparganosis, and hydatid disease.

Part five is devoted to arthropods of medical importance (1 chapter) belonging to several zoological groups. They are responsible for the transmission of many agents of human diseases or cause direct pathological lesions. Listed are the pentastomes (tongue worms), hair follicle worms, itch mites, fleas that cause myiasis, and the sand flea.

Part six called "General Summary" offers a review of parasites as they occur in different tissue and organ systems. This summary is provided as a guide for the anatomic pathologist who encounters a protozoan, a helminth, or an arthropod in a tissue section. The summary consists of tables listed in alphabetical order by organ systems. Each organ is subdivided in its main parts and a list of parasites is provided for each one. Each chapter concludes with an extensive list of references to the primary literature cited in full.

Textual information is extensively supported by numerous figures. They constitute line drawings, maps, X rays and CT scans, light and electron micrographs, clinical aspects, cutaneous and ocular lesions, and photographs of gross and microscopic pathology associated with parasitic infections. Unfortunately, many of the photographs have lost contrast in the printing because of unsuitable quality of the paper. This volume

presents an essential and very useful complement to standard textbooks of parasitology and medical zoology. It is closely related to the "Pathology of Protozoal and Helminthic Diseases" (Williams and Wilkins, Baltimore) edited by R. A. Marcial Rovas twenty years before (1991).

Judřich Jura



Sequence of mitochondrial D-loop in laboratory and wild strains  
of mice of genus *Mus*

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**Abstract.** A segment of three hundred forty (340) bp of mtDNA from D-loop region was sequenced in fifteen (15) laboratory strains of mice as well as in seven (7) wild mice of different species, subspecies and geographic origins. The data were compared with another three already published murine D-loop sequences. Eleven of the laboratory strains possessed an identical sequence, in BALB/c, C3H and DBA/2J a single (but different) mutation was detected and NZB differed in seven positions from other strains, being more similar to *M. m. musculus* than to *M. m. domesticus*. The differences between *M. m. domesticus* x *M. m. musculus* was as low as two substitutions (0.6%) while the highest observed interspecies difference in genus *Mus* (*M. m. domesticus* x *M. spidegus*) was 63 substitutions (19%) which suggest the age of the branching event approximately three million years. The results suggest that the method can be used for biosystematic studies on the wild mice, however, it is not sensitive enough to be used in genealogical studies on strains of laboratory mice.

INTRODUCTION

In spite the fact, that the mice become the universal mammalian model and most of aspects of its biology have been studied extensively, the origin and some details of a genealogical tree of many common laboratory strains are still dim. Also the biosystematics of its natural populations and the evolutionary relationships between the different members of the genus have only recently begun to be explored (Bonhomme et al. 1983, Bonhomme 1986, Moriwaki et al. 1986, Yonekawa et al. 1988). Studies on protein and mtDNA polymorphism have shown that the mitochondrial genome and most of the nuclear genome of the laboratory mouse originated from the European subspecies *M. m. domesticus* (Yonekawa et al. 1980, Bishop et al., 1985, Bonhomme 1986). It was even suggested that the old laboratory strains of inbred mice are descendents from a single female (Ferns et al. 1982). The history of breeding of these old strains is more or less known. There are still some open questions concerning of certain parts of their genealogical tree (Klein & Klein 1987). Moreover, there is always a possibility of genetic contamination that can be sometimes rather difficult or impossible to reveal. It would be desirable to get an experimental method for analysis of relationships between different strains of mice. A promising method for this purpose could be an analysis of DNA sequence data.

In this study we focused our attention on D-loop of mtDNA, taking an advantage of current development of PCR technique. We amplified 340 BP long part of a central region of D-loop of mtDNA of 15 laboratory strains of mice and compared its sequence with the sequences obtained from different species and subspecies of wild mice of genus *Mus*. The aim of this study is to evaluate which information on the origin of laboratory strain and on systematics of the genus *Mus*

can be obtained from comparison of this relatively short but highly polymorphic region of mtDNA.

## MATERIALS AND METHODS

### Organisms

**Animals** Laboratory strains of mice *A/J*, *AKR/J*, *BALB/c*, *C57BL/6J*, *C57BL/10J*, *C3H/HeJ*, *CBA/J*, *DBA/1J*, *DBA/2J*, *SJL/J*, *NZB*, *NZW*, *C57BR*, *CF1* and *DDD* (Tanaka et al. 1987) were obtained from Animal Center of Medical Faculty, University of Tokyo. The origin of wild mice, *M. musculus domesticus* Schwarz & Schwarz, 1943 (Dom-Pgn) (Canada, Pégion R.), *SK/Cam* (U.K., Skokholm I), *BFM/2 Mpl* (France, Montpellier), *M. m. musculus* Linnaeus, 1758 (Mus-Njl) (Denmark, Northern Jutland), *MBT* (Bulgaria, Toshevo) was described elsewhere (Nobuhara et al. 1989, Potter 1987). *M. sp. Har* originated from Harran (Sanli Urfa, Eastern Turkey) and *M. spicilegus* Petényi, 1882 from Austria. The D-loop sequences of *Rattus rattus* (Linnaeus, 1758), *R. norvegicus* (Berkenhout, 1769) and *Mus spretus* Lataste, 1883 were obtained from the EMBL database.

### Amplification, cloning and sequencing of DNA

Primers containing *Bgl* II restriction site in 5' end, 15308-GAAGATCTGATAGTATAAACATTACTCTG and 15686-GAAGATCTTGTTTCACGGAGGATGG were used for amplification. The number refers to the position of the 3' base of the primer in the complete mouse mtDNA sequence (Bibb et al., 1981). Less than 1 ng of purified DNA or DNA contained in 1 µl of 50 times diluted and 3 minutes boiled blood, was used as a template. The reaction mixture (50 µl) contained 50 mM KCl, 10 mM Tris-Cl pH 8.4, 1.5 mM MgCl<sub>2</sub>, 0.1 mg/ml gelatin, 0.2 mM dNTP mix, 250 nM primers and 1 u of Taq polymerase, the amplification was performed in 30 cycles consisting of 1 minute in 96°C, 1 minute in 55°C and 2 minutes in 74°C. The amplified segment was purified by centrifugation through 200 µl of Bio-Gel P 60, digested by *Bgl* II and cloned into *Bam* HI site of dephosphorylated BlueScript plasmid. Recombinant plasmids were isolated as dsDNA and sequenced in both directions using dideoxynucleotide method. Several recombinant plasmids were sequenced from every sample to exclude mutations that occurred artificially during the amplification. Program DNAPARS from system of programs PHYLIP 3.5 (Felsenstein, 1985) was used for a cladistic analysis and a for a construction of cladograms. Phenetic analysis was performed by a program Statistica (UPGMA, Percent disagreement distance).

## RESULTS

Fragment of the length 340 nucleotides from 15 laboratory strains of mice was sequenced. Eleven of these sequences were identical with the sequence reported for a laboratory mouse by Bibb et al. (1981). In BALB/c mouse A in position 15437 was substituted with G, in C3H mouse A in position 15614 was substituted with T, in DBA/2J mouse A in position 15540 was substituted with C. In the NZB mouse seven substitutions were detected (Fig. 1). To estimate an intraspecies and interspecies variability, the fragment of D-loop was sequenced in wild mice of seven different subspecies and species (Fig. 1). Two most similar subspecies, *M. m. musculus* and *M. m. domesticus*, differed in 0.6% positions only, while the two most dissimilar species, *M. m. domesticus* and *M. hortulanus*, differed in 19% positions. Within two hundred seventy (270) mutations detected, there were one hundred of the transitions (100) and one hundred sixty transversions (160). Eight (8) single-nucleotide deletions/insertions and two (2) dinucleotide deletions/insertions were also detected.

All polymorphic sites in the sequences were used for cluster analysis using the program Statistica. The percent disagreement distances between sequences were computed and the taxa were clustered by Unweighted Pair Group Method with Arithmetic mean (UPGMA). The tree diagram is shown in the Figure 2.

Taxonomically relevant characters, i.e. nucleotides in positions where at least two individuals share the same mutation and where two outgroup species, *Rattus rattus* and *R. norvegicus*,

```

GATCTTCTCTCTCAAGACATCAAGAAGAAGGAGCTA CTCCCCACCACCAGCACCCAAAGCTGATTTCTAATTAAAC 1
..... 2
..... 3
..... 4
..... 5
..... 6
.....G..... 7
..... 8
..A.....A..AT.....G..... 10
..... 11
..... 12

TACTTCTTGAGTACATAAATTFACATAGTACAACAGTACATTTATCTATATCGTACATTAAACTATTTTCCCCAAGCAT 1
.....G (BALB)..... 2
..... 3
..... 4
..... 5
..... 6
..... 7
.....C..... 8
.....T.....T.....A..... 9
.....T.....C.....T..... 10
.....C.....A.G.T.....G.....TT.AA..... 11
.....AC.....A..TC.....TT.AA.....TT.....C..... 12

ATAAGCTAGTACATTAAATCAATGCTTC AGGTCATAAAATAATCATCAAC ATAAATCAATATATATACCATGAATAT 1
.....C (DBA II)..... 2
.....A..... 3
.....T.....G..... 4
..C..A.....T..... 5
.....A.....C..... 6
.....A..... 7
.....A.....A.....T.....A.CT..CA.....CC..AC.....AT.C.CTC.....G..... 8
.....A.....A.....ACAT..ACA.....C..AC.....CTGT..C.CTC.T..... 10
.....AT.....ATA..T..TT..AT..A..TT.....A.....C.T.T.AAC.....T.....TC.....C.A.....TC..... 11
.....AT.....ATA..T.ATT..AT..ATT..A.A.....T.T.AAC.....ATTAA..CC.A..... 12

TATCTTAAACACATTAAACTAATGTT ATAAGGACATACTGTGTTATCTGACATACACCA TACAGTCATAAACTCT 1
.....T (C3H)..... 2
..... 3
.....T.....T..... 4
.....T.....T..... 5
.....T.....T..... 6
.....C.....T..... 7
.....T..... 8
.....A.....T.....TC.....T.T.A.....C..... 9
.....ACCT..T.....T.....C..A.....C..... 10
..C..T.....A.....C.TGT.....TA.....G.....TA.....CT. 11
..TC..T.....GA.....TGT..A.....CTA.....T..A.....T.. 12

TC TCTTCATATGACTATCCCTTCCCCATTGGTCTATTAATCTA 1 Laboratory strains
..... 2 BALB/C, DBA II, C3H
..... 3 M.domesticus Canada, UK
..... 4 M.domesticus France
.....C..... 5 NZB
..... 6 M.musculus Denmark
..... 7 M.musculus Bulgaria
..... 8 M.musculus Turkey
..... 9 M.spretus
.....C..... 10 M.spicilegus
.....TGT..A.A.....C.ATT..... 11 R.norvegicus
..C.....T.AA..TA.G.....C.ATT..... 12 R.rattus

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Fig. 1. Sequence of the D-loop fragment of different mice of genus *Mus*. For the list of laboratory strains see Materials and Methods.

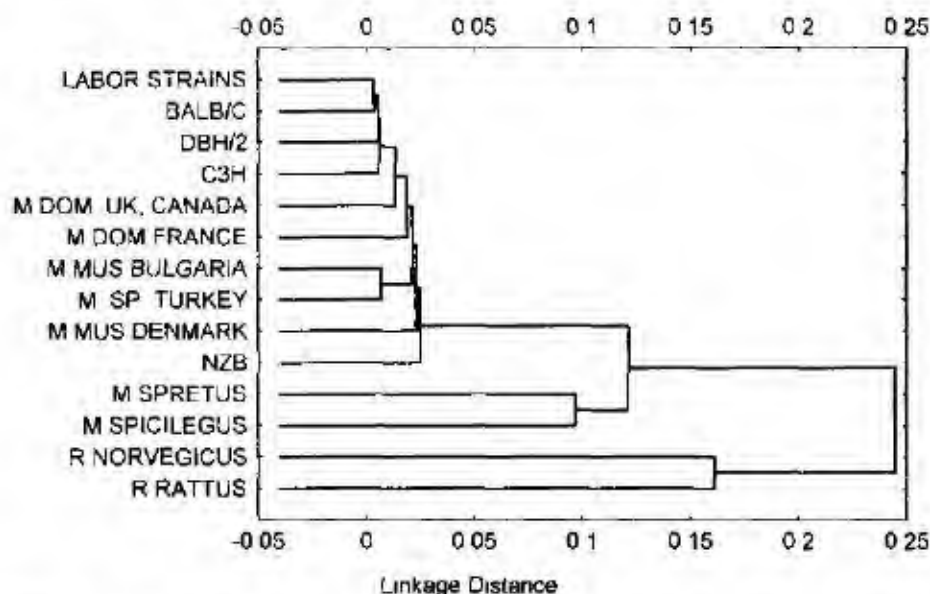


Fig. 2. Phylogenetic tree of genus *Mus* constructed by UPGMA on the basis of sequences of D-loop of mtDNA. For details see Materials and Methods.

have an identical nucleotide, were analyzed using program for cladistic analysis DNAPARS. Set of cladograms differing in minor details were obtained (the results not shown). In general, there was a good agreement between results of UPGMA and those of cladistic analysis as well as between our results and present knowledge on the phylogeny of the genus *Mus* (Bonhomme 1986). According to our results, *Mus spicilegus* branched out before *Mus spretus*. Unexpectedly, the laboratory strain NZB was more closely relative to *Mus musculus musculus* than to *Mus musculus domesticus*.

#### DISCUSSION

Single (but different) mutation was detected in BALB/c, C3H and DBA/2J mice. Positions of these strains within the genealogical tree of laboratory mice (Klein & Klein 1987) suggested, that these mutations either occurred or were fixed in populations of mitochondria independently during the history of breeding of laboratory strains. Alternatively, the results could be explained by the existence of polymorphism in populations of mice in the founder colony or in the population of mitochondria in the founder mice cells.

The sequence of D-loop in NZB mice differed from other laboratory strains in seven positions. This strain was developed in Otago Medical School mouse colony, New Zealand, from randomly bred mice brought by W. H. Hall in 1930 from Imperial Cancer Research Fund Laboratories at Mill Hill, London (Bieloschowsky & Goodall 1970). It was pointed out by others that the mtDNA of this strain differed from mtDNA of other strains of laboratory mice (Ferris et al. 1983). Our data showed that the sequence of the D-loop fragment of NZB mice was more similar to *M. m. musculus* than to *M. m. domesticus*. This fact suggested that, in contrast to other laboratory strains, mtDNA of NZB strain could originate from *M. m. musculus*, rather than from *M. m. domesticus*. Classical inbred strains of mice are supposed to be derived from *M. m. dome-*

*sticus* (Ferris et al. 1983). Most of them, however, are in fact recombinants between *domesticus*- and *musculus*-like genomes (Blank et al. 1986). It was shown, for example, that most of these strains contain a Y chromosome from *M. m. musculus* (Bishop et al. 1985). It is supposed, that *M. musculus* genes have been introduced into laboratory mice's genomes by hybridization with wild *M. m. musculus* males. In NZB strain, however, the *M. m. musculus* mouse had to be introduced by female, because of maternal character of mtDNA inheritance. Relatively low intrasubspecies variability was detected in D-loop. In fact, *M. m. domesticus* mice captured in England and Canada had identical sequences of D-loop. We believe, that it can be explained by relatively recent history of colonization of America by house mouse, paralleling those of the modern men. The most distant sequences were those of *M. m. domesticus* and *M. spicilegus*. Nearly 19% of different nucleotides (after correction for multiple substitutions) suggested that these two species might diverge nearly three millions years ago (She et al. 1990).

Most of the detected mutations were substitutions. Ten different deletions/insertions have been also found. The polymorphism in position 15546, the deletion of TA dinucleotide, was detected in some *M. m. musculus*, as well as in some *M. m. domesticus* mice (cf. Fig. 1). It suggested, that the identical mutation occurred either in two different subspecies independently, or the polymorphism in this locus is older than the event of separation of these two taxons. The interspecies vertical transfer of mtDNA polymorphism can occur rather easily, because of an existence of multiple copies of mtDNA in one cell. The amount of polymorphism in 340 bp. long fragment of D-loop of mtDNA was not high enough for genealogical studies at the level of laboratory-mice strains. The fragment covered approximately 1/3 of all D-loop, of the most variable part of mtDNA. It is theoretically possible that the sequencing of longer fragments of mtDNA could reveal additional variability for phylogenetic analysis. The presence of multiple copies of mtDNA in one cell and the possibility of an existence of the polymorphism in mtDNA population, however, could lead to random fixation of the same mutation in unrelated strains of mice. If only limited set of mutations is available for the analysis, such random fixation could dramatically influence on the results of the study. The example of TA-deletion polymorphism in both *M. m. musculus* and *M. m. domesticus* suggested, that such phenomenon should be seriously considered during the analysis of mtDNA data.

The frequency of polymorphic positions in mtDNA in our sample of wild mice was high enough for phylogenetic analysis at the interspecies level. Further study is necessary, to find out the range of variability for mice collected in different parts of their geographical area. The amount of data obtained in single analysis, the easiness of collecting of biological material (blood smears) as well as the possibility of application of this nondestructive method on museum specimens make this method superior in comparison with other biochemical methods used in molecular taxonomy.

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**Reproduction in the Wood mouse (*Apodemus sylvaticus*) in urban habitats of Prague: III. Population structure, sexual maturation and breeding intensity in females**

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**Reproduction, synurbanization, *Apodemus sylvaticus***

**Abstract.** The study is based on material of 1634 females snap trapped during the years 1969-1990 in 65 localities in the city of Prague. Sexual maturation in relation to body weight, body length structure in population, ratio between immature and mature specimens, proportion of pregnant females, and birth rates were studied. Data on the breeding season in *A. sylvaticus* throughout its distribution area available in the literature were summarized and compared. In Prague, breeding season lasts from February to November. However, only small proportion of litters is produced there during the first two and the last two months of the breeding season. Mean number of litters and newborns per adult female and season were 4.53 and 22.4, respectively.

**INTRODUCTION**

The Wood mouse, *Apodemus sylvaticus* (Linnaeus, 1758) appeared to be a dominant small mammal species in green areas (woods, parks, cemeteries, riparian sites etc.) of Prague, even in relatively small isolated plots surrounded by built up areas (Frynta et al. in print).

In the last years we studied systematically its ecology and reproduction there. In view of the influence of urbanization gradient on Striped-field mouse (*Apodemus agrarius*) population described by Andrzejewski et al. (1978) in Warsaw, we also tried to analyze possible effects of this gradient on the Wood mouse population in Prague. So far, the male reproduction (Frynta 1992), litter size (Frynta & Vohralík 1992), body weight (Frynta 1993) and sex ratio (Frynta & Žižková 1993) have been elaborated. This paper deals with intensity of reproduction, sexual maturation and population structure in females.

Reproduction of urban populations of this species was not systematically studied, until now. There are numerous papers dealing with reproduction in populations from natural or seminatural habitats. Unfortunately, only few of them are based on the material being both numerous and collected during all seasons of the year. As concerned the intensity of reproduction, only few Central European populations were analyzed so far: south Moravian, collected in diverse lowland habitats including woods and fields (Pelikán 1966), north Bohemian, collected in different succession stages of spoil-banks after the surface mining (Bejček 1979), north German (vicinity of Kiel), trapped in ecotones, woods and fields (Judeš 1979) and west Bohemian, collected in diverse localities of that region (Hůrka & Němec 1985).

## MATERIAL AND METHODS

Our Wood mouse material was collected in 65 localities, distributed on the territory of the city of Prague, central Bohemia. Woodland, shrubwood and meadows were the most frequent habitats of Wood mice. According to the urbanization gradient, the localities could be sorted into three categories:

1) Parks or cemeteries in the center of the city, completely surrounded by built-up areas (below mentioned as *central parks*).

2) Parks, gardens or other man made green habitats, ruderal sites etc. on the periphery of the city, not completely surrounded by built-up areas (*peripheral parks*).

3) Woods or other *seminal* habitats on the outskirts of Prague (*woods*).

From the ecological point of view it is important that the most related species, the Yellow-necked mouse (*Apodemus flavicollis*), occurs only in the localities of the third category. Therefore, possible competition between these two species could be excluded in the localities of the first two categories.

The complete survey of the Wood mouse material captured in the territory of Prague in the period 1969 - 1990, including the description and classification of localities, number of individuals caught during each trapping effort and also collectors names, is given in a separate paper (Frynta et al. in print). All this material, with the exception of mice from localities Nos. 8, 23, 24, 25, 26, 74, 75 and part of specimens from localities Nos. 32, 33 and 73 (cf. Frynta et al. 1992), is deposited in collections of the Department of Zoology, Charles University, Prague and was available for our study. In all, 1634 females of the Wood mouse were treated, of which 454, 701, and 479 were captured in the localities of the first, second and the third category, respectively.

Wood mice were captured in small snap traps of the common type. After capture, all specimens were weighed, measured, dissected, and the condition of their sexual organs was ascertained. Presence of macroscopically visible embryos, their number and length were recorded as well as the number of placental scars. The body length (taken from the snout to the anal orifice) was measured with the precision of 1 mm. The body weight was identified to the nearest gram. In pregnant females only net body weight (i.e., without embryos) was used in further analysis. It was calculated on the basis of relationship between the length of an embryo and its weight as described in the Bank vole, *Clethrionomys glareolus* by Zepda (1968).

The term *immature* females is used for specimens which already have taken part in the reproduction, i.e., for females being either actually pregnant or lactant, or showing traces of the reproductive activity from the past (placental scars). On the contrary, for females which probably never have attained pregnancy during their life the denotation *immature* is used. All mature females as well as overwintered part of immature females captured in spring months (January-April) are denoted as *adult*, while for immature specimens probably born in the current year the denotation *subadult* is used.

In estimation of breeding intensity we modified the method for determination of average number of litters per breeding season suggested by Emlen & Davis (1948). In contrast to the method by above authors who calculated mean number of newborns per adult female and breeding season using whole season averages of reproductive parameters, we used the following procedure. Average number of litters per female and month ( $F$ ) was calculated for each month separately, using the equation

$$F = I / (G - B)$$

In which:  $I$  = proportion of pregnant among adult females,  $t$  = number of days in month,  $G$  = gestation length in days,  $B$  = number of days before embryos can be macroscopically detected. We used the value 18 days for parameter  $G-B$  (length of visible pregnancy), as suggested by Pelikán (1966).

Multiplying values by monthly mean litter sizes computed for non-resorbed embryos only (cf. Frynta & Vohralík 1992) we derived average number of newborns per adult female and month. The sum of these values computed for all months of the year we consider to be more precise estimation of mean number of litters or newborns per breeding season and female than commonly used computing those as the whole season averages.

## RESULTS

### Sexual maturation in relation to body weight

During the period of intensive reproduction (May-August), increase in the proportion of mature specimens within subsequent weight categories seems to reflect the intensity of sexual

Table 1 Proportion of sexually mature females within the individual weight categories during period of intensive reproduction (May-August)

	upper limits of weight categories (g)											
	9	11	13	15	17	19	21	23	25	27	29	35
May												
n females	6	8	6	8	10	8	14	25	14	4	6	4
mature	0	0	0	1	5	6	12	21	12	3	4	4
%	0	0	0	13	50	75	86	84	86	75	67	100
June												
n females	14	4	3	7	4	7	17	20	18	7	8	5
mature	0	0	0	1	4	3	12	19	18	7	8	5
%	0	0	0	14	100	43	71	95	100	100	100	100
July												
n females	4	4	6	15	14	13	16	12	13	9	1	5
mature	0	4	0	4	5	9	14	12	13	9	1	5
%	0	0	0	27	36	69	88	100	100	100	100	100
August												
n females	11	20	14	23	20	26	23	15	13	9	3	
mature	0	0	0	3	9	24	23	15	13	9	3	
%	0	0	0	13	45	92	100	100	100	100	100	
Total May-August (present study)												
n females	35	36	29	53	48	54	70	72	58	29	18	14
mature	0	0	0	9	23	42	61	67	56	28	16	14
%	0	0	0	17	48	78	87	93	97	97	89	100
South Moravia May-August (Pelikan 1967)												
n females	6	6	5	10	27	32	35	33	24	22	16	12
mature	0	0	1	4	13	24	32	33	24	22	16	12
%	0	0	20	40	48	75	91	100	100	100	100	100

maturation process. From Tab. 1 it is visible that first mature females occur in the weight category 14-15 g. In the total material from this period the nine of 53 specimens (17 %) belonging to this weight category were mature. In the following weight categories a gradual increase in percentage of sexually active individuals was found: 48 %, 78 % and 87 % (corresponding upper limits of the body weight: 17, 19 and 21 g). Within weight categories above 21 grams only small proportion of females (up to 11 %) remained immature.

Minimal body weight of mature females (Tab. 2) varied during the year from 14 g to 21 g (February). It was high in spring samples (March 20 g, April 18 g), decreases in the early summer (May-June 15 g) and reaches 14 g in the late summer and autumn (July-November). It is in accord with another trend - decrease in the proportion of immature females within higher weight categories (above 19 g) during the summer. This proportion decreased from 16 % (n=67) in May to zero in August (n=63) which suggests, that in the second half of the reproductive season intensity of maturation considerably increases.

### Population structure

Body length was identified to be more closely correlated with age than body weight in female Wood mice raised in laboratory conditions (Frynta & Žitková 1992). That is why we used frequency distribution of body length for the simple graphic description of population

structure in our Prague material (Figs 1, 2). Overwintered specimens prevail in winter and spring samples. Comparing samples from this period (January-April), slight trend to the increase in the body length of overwintered specimens caused probably by growth of animals is visible. The first specimens born in the current year appeared in March and April, but their proportion in the samples was low amounting only 4 % (n=25) and 7 % (n=60), respectively. In this period they are still distinguishable from overwintered ones according to the small size and to the juvenile coloration of pelage. Their proportion rapidly increased during the summer-early autumn period (May-September) and changed the pattern of diagrams. Intensive reproduction in this period is documented also by the frequent occurrence of specimens in the lowest weight classes (cf. Tab. 2). In the autumn (October, November) and winter (December, January-February) samples the most frequently represented were specimens of the length category 81-85 mm (or also 86-90 mm in the last one), born probably during the late summer.

Table 2. Incidence of sexually mature (MA - pregnant or with placental scars) and immature (IMM) females according the body weight during the year.

weight (g)	January		February		March		April		May		June		July		August		September		October		November		December	
	IMM	MA	IMM	MA	IMM	MA	IMM	MA	IMM	MA	IMM	MA	IMM	MA	IMM	MA	IMM	MA	IMM	MA	IMM	MA	IMM	MA
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-	-	-	-	3	-	1	-	-	-	-	-	-	-	-	-	-	-
7	-	-	-	-	1	-	-	-	1	-	2	-	3	-	3	-	1	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-	-	4	-	4	-	3	-	4	-	5	-	1	-	1	-	-	-
9	-	-	-	-	-	-	-	-	1	-	5	-	2	-	4	-	3	-	2	-	3	-	-	-
10	-	-	-	-	-	-	1	-	5	-	1	-	3	-	12	-	10	-	4	-	3	-	-	-
11	-	-	-	-	-	-	1	-	3	-	3	-	1	-	8	-	6	-	3	-	5	-	-	-
12	-	-	-	-	-	-	-	-	4	-	-	-	2	-	7	-	10	-	9	-	12	-	-	-
13	3	-	-	-	-	-	1	-	2	-	3	-	4	-	7	-	8	-	8	-	17	-	-	-
14	2	-	-	-	-	-	2	-	5	-	2	-	7	2	6	1	19	3	16	1	34	1	3	-
15	1	-	-	-	3	-	2	-	2	1	4	1	4	2	14	2	8	2	19	1	48	1	1	-
16	4	-	1	-	-	-	5	-	2	-	-	1	7	2	11	4	15	-	6	5	45	2	10	-
17	2	-	3	-	2	-	3	-	3	5	-	3	2	3	-	5	4	2	7	2	24	1	3	-
18	1	1	3	-	5	-	2	1	1	-	1	-	3	4	2	10	8	6	9	3	35	11	2	-
19	5	1	-	-	2	-	3	2	1	4	1	4	1	5	-	14	-	6	9	2	13	14	1	1
20	2	-	2	-	2	-	1	3	-	7	2	5	1	7	-	8	3	9	1	5	1	21	1	-
21	2	-	2	1	1	-	1	5	2	5	1	7	1	7	-	15	1	11	1	5	5	9	1	2
22	2	2	-	-	2	1	2	2	2	14	1	12	-	7	-	6	1	16	1	7	3	17	1	-
23	-	1	-	-	1	-	1	2	2	7	-	7	-	5	-	5	-	11	1	7	-	7	2	-
24	1	-	-	-	2	-	1	5	1	5	-	10	-	8	-	9	-	10	-	4	-	9	-	1
25	-	-	-	-	1	-	4	1	7	-	8	-	5	-	4	-	4	-	1	-	7	-	-	-
26	-	-	-	-	1	1	3	1	-	-	2	-	5	-	3	1	5	-	2	-	4	1	-	-
27	-	-	-	1	-	-	-	-	3	-	5	-	4	-	6	-	5	-	3	-	1	-	-	-
28	-	-	-	-	-	-	2	2	4	-	6	-	-	-	2	-	2	-	1	-	1	-	-	-
29	-	-	-	1	-	-	1	-	-	-	2	-	1	-	1	1	3	-	-	-	4	-	-	-
30	-	-	-	-	-	-	-	-	1	-	4	-	2	-	-	-	3	-	-	-	-	-	-	-
31	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-
32	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
33	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
34	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
35	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Total	20	5	11	2	19	5	27	30	45	68	34	79	40	72	78	95	106	100	92	41	253	106	24	4

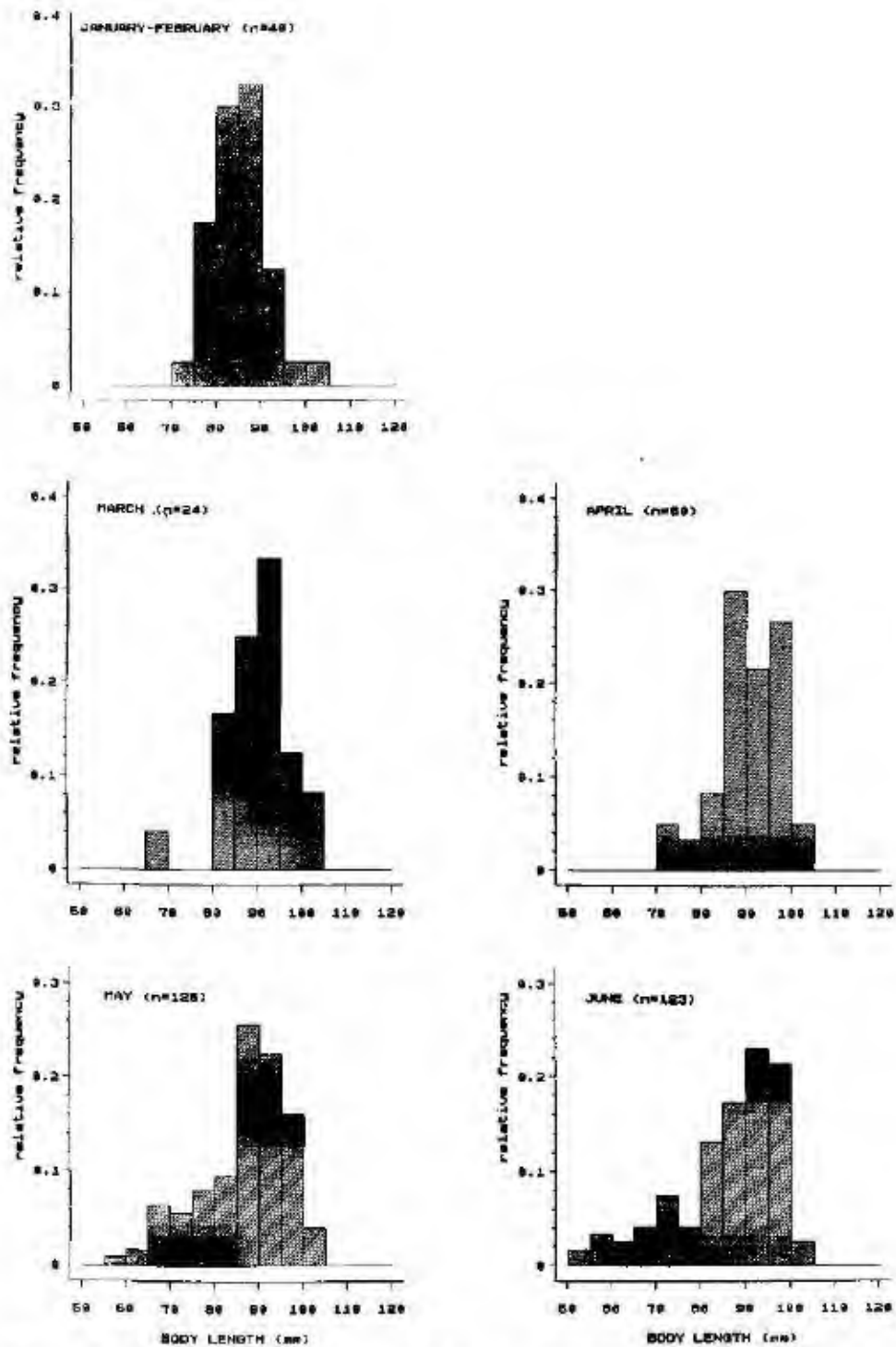


Fig. 1. Variation in the body length in *Apodemus sylvaticus* population during the year (January - June).  
Explanation: Individual body length categories contain all the values exceeding the lower limit and being smaller or equal to the upper one.

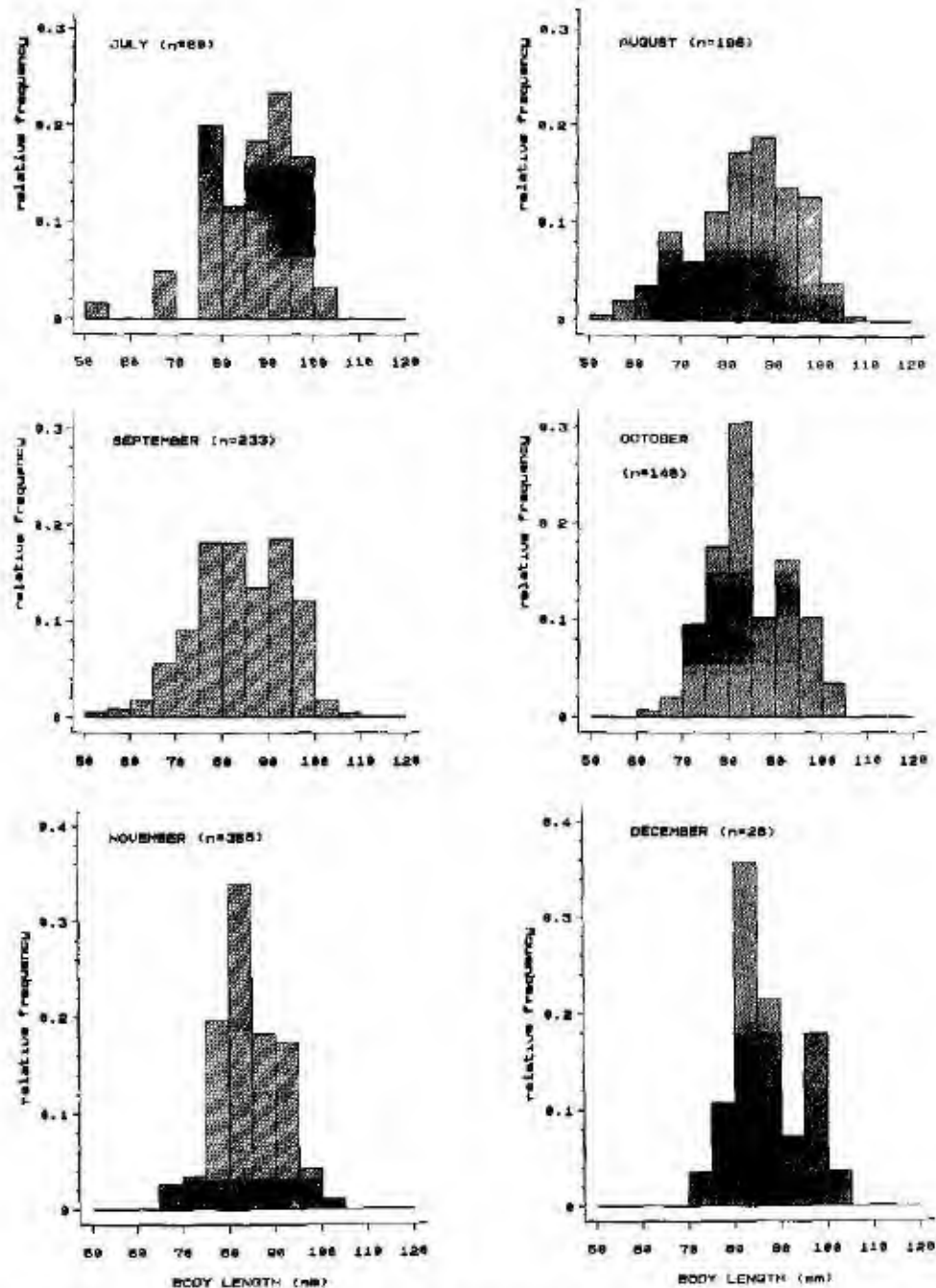


Fig. 2. Variation in the body length in *Apodemus sylvaticus* population during the year (July - December). For explanation see Fig. 1.



### Proportion of mature part of population

Variation in proportion of mature females during the year reflects age structure and seasonality of reproduction (Tab. 3). In the period of intensive reproduction (May-August) majority of mature females were pregnant or lactant. Proportion of mature females in the sample was 60 % in May (n=115) and in June increased up to peak value 70 % (n=127). Gradual decrease in the following months is result of mass occurrence of young animals in the late summer and early autumn (July 65 %, n=116, August 56 %, n=180, September 49 %, n=209) and of termination of maturation process at the end of breeding season (October 32 %, n=137, November 30 %, n=363). Unfortunately, only scarce material is available from winter months. Only 14 % of females in December (n=28) and 19 % (n=26) in January were mature, i.e., still showing visible placental scars from previous breeding season. Most probably, this drop was caused by selective mortality of mature animals. However, possible disappearance of placental scars during the winter months can not be excluded.

The term mature comprises both animals which took part in the reproduction during the previous and in the current reproductive seasons. Therefore, it is less useful for the spring samples in which both groups are represented. In February two (14 %) of 14 specimens were mature, one being pregnant and one with placental scars from previous season. Six of 25 females caught in March, i.e. 24 %, were mature. Four of those showed old placental scars, one of them being simultaneously pregnant. Two remaining females were pregnant without trace of previous reproduction. In April percentage of mature specimens increased rapidly (53 %, n=57). At least six of 30 mature females captured in this month have matured probably in the previous breeding season as indicated by the presence of placental scars without lactation or another signs of recent reproductive activity. As it is visible from the Tab. 3, the percentage of mature females did not show any trend with the urbanization gradient.

Table 3. Variation in the proportion of mature females during the year

month	central parks			peripheral parks			woods			total		
	n	mature	%	n	mature	%	n	mature	%	n	mature	%
January	6	3	50	11	2	18	9	0	0	26	5	19
February	2	0	0	10	0	0	2	2	100	14	2	14
March	3	0	0	13	3	23	9	3	33	25	6	24
April	21	13	62	30	13	43	6	4	67	57	30	53
May	31	17	55	45	26	58	39	26	67	115	69	60
June	94	64	68	23	18	78	10	6	60	127	88	70
July	22	12	55	68	44	65	26	19	73	116	75	65
August	90	49	54	73	42	58	17	9	53	180	100	56
September	35	17	49	99	48	48	75	37	49	209	202	49
October	21	3	14	56	20	36	60	21	35	137	44	32
November	127	42	33	77	33	43	159	32	20	363	107	30

### Breeding intensity

The breeding in Prague Wood mouse population shows marked seasonal character. We used proportion of pregnant among all females captured for the description of breeding intensity during the year. As indicated by data in Tab. 4, the first pregnant female was found in February (7 %, n=15). In March, their proportion increased rapidly to 25 % (n=25). Later follows the spring-summer period of maximal values of this parameter (April 30 %, n=60, May 29 %, n=60).

n=126, June 32 %, n=132, July 27 %, n=133, August 25 %, n=248) Marked drop in breeding intensity was recorded in September (13 %, n=272) and October (2 %, n=189) Only less than 1% of females were found pregnant in November (n=380)

Table 4 Variation in the proportion of visibly pregnant females during the year

month	central parks			peripheral parks			woods			total		
	n	preg	%	n	preg	%	n	preg	%	n	preg	%
January	6	0	0	11	0	0	9	0	0	26	0	0
February	2	0	0	11	0	0	2	1	50	15	1	7
March	3	0	0	13	1	8	9	2	22	25	3	12
April	21	6	29	31	9	29	8	3	38	60	18	30
May	31	5	16	45	14	31	50	17	34	126	36	29
June	95	32	34	23	9	39	14	1	7	132	42	32
July	22	4	18	84	21	25	27	11	41	133	36	27
August	90	21	23	126	35	28	32	5	16	248	61	25
September	35	7	20	156	19	12	81	9	11	272	35	13
October	21	0	0	105	2	2	63	2	3	189	4	2
November	128	3	2	89	0	0	163	0	0	380	3	1
December	-	-	-	7	0	0	21	0	0	28	0	0
May-Aug	238	62	26	278	79	28	123	34	28	639	175	27

In order to exclude the influence of variation in the proportion of young specimens unable to reproduce on the percentage of pregnant females, we sorted females into categories according to their body weight. All females heavier than 20 grams were considered to be old enough to take part in reproduction, while specimens which attained at least the minimal weight of pregnant or lactant females, i.e., 14 grams, but not heavier than 20 g, were counted as potentially able to reach maturity. The border value 20 g was established arbitrary on the basis of relationship between female sexual maturation and the body weight (see the chapter 'sexual maturation')

From comparison of these female groups (Tab. 5, 6) it is evident that in spring and autumn the incidence of pregnancy was higher among the heavier (i.e., above 20 g) females. However, the opposite situation was observed during the period of intensive reproduction (May-August) in which the proportion of pregnant females within this category was lower (32 %, n=275) if compared with the lightest weight category (36 %, n=217).

Table 5 Variation in the proportion of visibly pregnant specimens among females in the weight category 14-20 g during the breeding season

month	central parks			peripheral parks			woods			total		
	n	preg	%	n	preg	%	n	preg	%	n	preg	%
February	1	0	0	8	0	0	-	-	-	9	0	0
March	3	0	0	5	0	0	4	1	25	12	1	8
April	7	1	14	15	2	13	4	1	25	26	4	15
May	6	3	50	14	4	28	13	7	54	33	14	42
June	21	7	33	3	2	67	1	0	0	25	9	36
July	6	1	17	38	12	32	11	6	55	55	19	35
August	37	12	32	45	21	47	22	3	14	104	36	35
September	17	2	12	53	3	6	40	3	8	110	8	7
October	15	0	0	55	0	0	35	0	0	105	0	0
November	86	0	0	60	0	0	116	0	0	262	0	0
May-Aug	70	23	33	100	39	39	47	16	34	217	78	36
Total	199	26	13	296	44	15	246	21	9	741	91	12

Table 6 Variation in the proportion of visibly pregnant among females in the weight category above 20 g during the breeding season

month	central parks			peripheral parks			woods			total		
	n	preg	%	n	preg	%	n	preg	%	n	preg	%
February	-	-	-	3	0	0	2	1	50	5	1	(20)
March	-	-	-	5	0	0	5	1	20	10	1	10
April	12	5	42	15	7	47	4	2	50	31	14	45
May	13	2	15	25	10	40	28	8	29	66	20	30
June	47	21	45	15	7	47	9	1	11	71	29	41
July	10	3	30	36	9	25	11	5	45	57	17	30
August	29	9	31	50	13	26	2	0	0	81	22	27
September	12	4	33	54	16	30	32	6	19	98	26	27
October	1	0	0	19	0	0	17	2	12	37	2	5
November	30	3	10	17	0	0	22	0	0	69	3	4
May-Aug	99	35	35	126	39	30	50	14	28	275	88	32
Total	154	47	31	239	62	26	132	26	20	525	135	26

As another expression of breeding intensity we computed also percentage of pregnant among adult females (Tab. 7). The denotation adult comprises not only all mature, but also all overwintered females captured from January to April. Throughout the spring this percentage increased from 7 % in February ( $n=14$ ) and 13 % in March ( $n=24$ ) up to 31 % in April. This trend continued during the early summer when the highest values were attained (May 46 %,  $n=68$ , June 48 %,  $n=88$ ). Thereafter, the percentage decreased slightly in July (40 %,  $n=75$ ) but remained at the fairly high level till August (44 %,  $n=100$ ). Rapid autumnal drop was observed from September (26 %,  $n=102$ ) till the end of the breeding season (October 9 %,  $n=44$ , November 3 %,  $n=107$ ).

Differences in proportion of pregnant females (given as percentage in all females, adult females or within weight categories) in samples captured in localities of different urbanization degree were studied also. As it is visible from Tabs 4-7, no clear trend was found.

Average number of litters per female and month as well as average number of newborns per adult female and month are given in Tab. 8. These values indicate that only unimportant amount of litters and newborns per adult female is produced during early spring (February-March) or late autumn (October-November). On the contrary, the period from May till August is characterized by highest values of these reproductive parameters. Resulting values of mean number of litters or newborns per breeding season and adult female, obtained by summing the values for individual months are 4.53 and 22.4 respectively.

#### DISCUSSION

Intensity of maturation, given as a gradual increase in percentage of sexually mature specimens within individual weight categories, in Prague as compared with the situation in South Moravian populations described by Pehkán (1967), seems to be similar (Tab. 1). In both populations 48 % of specimens within the weight category 16-17 g are mature. Slight differences are probably due to inclusion of all females possessing corpora lutea into the category of adults in the material from South Moravia.

We compared literary data on length of breeding season in individual Wood mouse populations (Tab. 9). Generally, reproduction seems to be concentrated to spring - early autumn period in majority of regions. The only exception are populations inhabiting extremely warm areas (i.e.,

Table 7. Variation in the proportion of pregnant among adult females during the year (January - April: adult = overwintered, May - December: adult = mature)

month	central parks			peripheral parks			woods			total		
	n	preg	%	n	preg	%	n	preg	%	n	preg	%
January	6	0	0	11	0	0	9	0	0	26	0	0
February	2	0	0	11	0	0	2	1	50	15	1	7
March	3	0	0	12	1	8	9	2	22	24	3	13
April	18	6	33	28	9	32	6	1	17	52	16	31
May	17	5	29	26	14	54	25	12	48	68	31	46
June	64	32	50	18	9	50	6	1	17	88	42	48
July	12	4	33	44	15	34	19	11	58	75	30	40
August	49	21	43	42	18	43	9	5	56	100	44	44
September	17	7	41	48	12	25	37	8	22	102	27	26
October	3	0	0	20	2	10	21	2	10	44	4	9
November	42	3	7	33	0	0	32	0	0	107	3	3
December				1	0	0	3	0	0	4	0	0
May-Aug	142	62	44	130	56	43	59	29	49	331	147	44

lower elevations of Spain, Corsica and N. W. Africa), which reproduce from autumn throughout the winter till spring, and later during warm period of year their reproduction is interrupted (Kowalski 1985, Moreno & Kudner 1988, Fons & Saint-Giron 1993). Duration of breeding season in Prague lasting from February till November is longer than it was found in other geographically close populations. This prolongation may be attributed to specific climatic conditions, especially to higher temperature in the urban agglomeration. Low temperatures were recognized as important factor blocking in interaction with short photoperiod the maturation of female sexual organs in captive *Apodemus sylvaticus* (Clarke 1985). On the other hand, length of reproductive season varied from year to year and winter reproduction probably occurs regularly, but in low incidence, in some populations (Jewell 1966). Therefore, the larger the material available, the longer reproductive season is reported. Unfortunately, from only few populations studied so far, large samples collected in the course of several years, which are complete enough to be sufficient for more detail comparison are available.

Table 8. Mean production of litters and newborns per female computed separately for females heavier than 13 g [I], heavier than 20 g [II] and for adult (January-April: adult = overwintered, May-December: adult = mature) females [III]. For the procedure and equation see Material and methods

Month	Percentage of pregnant females			Average number of litters per female			Mean litter size	Average number of newborns per female		
	I	II	III	I	II	III		I	II	III
February	7	20	7	0.11	0.31	0.11	6.00	0.66	1.86	0.66
March	9	10	13	0.16	0.17	0.22	3.67	0.59	0.62	0.82
April	32	45	31	0.53	0.75	0.52	5.11	2.71	3.83	2.64
May	34	30	46	0.59	0.52	0.79	4.97	2.93	2.58	3.94
June	40	41	48	0.67	0.68	0.80	5.24	3.51	3.56	4.19
July	32	30	39	0.55	0.52	0.69	4.81	2.65	2.51	3.23
August	31	27	44	0.53	0.47	0.76	4.87	2.58	2.29	3.69
September	16	27	26	0.27	0.45	0.43	5.34	1.44	2.40	2.31
October	1	5	9	0.02	0.09	0.16	4.50	0.09	0.41	0.70
November	1	4	3	0.02	0.07	0.05	5.00	0.10	0.35	0.25
Total				3.45	4.03	4.53		17.26	20.41	22.43

Table 9. Comparison of breeding season in individual populations of *Apodemus sylvaticus*

Population	Duration of the breeding season
Africa	
Oran, N.W. Algeria [1]	October - February
Iberian Peninsula	
Donana, S.W. Spain [2]	October - April (+August)
Montseny, N.E. Spain [3]	May - February
Pyrenees, N.E. Spain [3]	May - December
France	
Corsica [4]	September - March (+June)
Camargue [5]	March/April - October
Bretagne, Loire Atlantique [4,6]	February - October
département de l'Essonne, Paris [4]	March - December
Great Britain	
Hertsfordshire, England [7]	February - October (+Jan)
Small Islands around GB	
St Kilda Island [8]	May - August
Skomer Island [9]	April - September
Channel Islands * [10]	March - October
Germany	
Schleswig Holstein [11]	March - September
Central Europe	
Mostecko, Northern Bohemia [12]	April - September
Tabor region, Southern Bohemia [13]	March - September
Czech Karst, Central Bohemia ** [14]	March - October
Prague, C. Bohemia [15]	February - November
Western Bohemia [16]	February - October
Southern Moravia [17]	February - November
Stockerau, N.E. Austria [18]	February - September
Balkan Peninsula	
Petrich, S.W. Bulgaria [19]	February - November
Rozovata dolina, Bulgaria [20]	March - December
Bulgaria [21]	March - October

[1] Kowalski (1985), [2] Moreno & Kufner (1988), [3] Sans Coma & Gosálbez (1976), [4] Fons & Saint-Girons (1993), [5] Jamon (1986), [6] Saint-Girons (1966-1967), [7] Baker (1930), [8] Jewell (1966), [9] Fullagar (1962) ex Jewell (1966), [10] Bishop & Delany (1963), [11] Jules (1979), [12] Bejček (1979), [13] Zbytovský (1989), [14] Konečný (1978), [15] Present paper, [16] Húrka & Němec (1985), [17] Pelikán (1966), [18] Steiner (1968), [19] Matejva (1972), [20] Christov (1974), [21] Straka (1965).

\* i.e., following islands: Guernsey, Jersey, Sark, Alderney

\*\* *Apodemus* sp. i.e. *Apodemus sylvaticus* and *A. flavicollis* were not differentiated, but *Apodemus sylvaticus* predominated in the material

As far as the Central European region is concerned, the proportion of visibly pregnant among all females collected during the season of intensive reproduction (May-August) is usually higher than 27 % (n=639) found in Prague. From Czech Republic, Bejček (1979) reported 32 % (n=81) in population inhabiting an extreme habitat - North Bohemian spoil-banks, Húrka & Němec (1985) in Western Bohemia found 39 % (n=239) and Pelikán (1966) even 48 % (n=192) in Southern Moravia.

Percentage of pregnant among adult females is less susceptible to the variation in the population structure. However, also this parameter of breeding intensity is relatively low in our mate-



rial. In the period May-August it was only 44 % (n=331) in Prague, while 63 % (n=145) and 69 % (n=64) were reported from Southern Moravia (Pelikán 1966) and North Germany (Judes 1979), respectively. Lower value 37 % (n=70) was found in North Bohemian population only (Bejček 1979).

Mean number of litters and newborns per adult female computed by Pelikán (1966) for South Moravian populations (4.85 litters, 27.0 newborns) were higher than our estimations for Prague population (4.5 litters, 22.4 newborns, computed for adult females only, see Tab. 8). However, it is to be remarked here, that Pelikán (l.c.) used for his computation the original equation according to Emlen & Davis (1948) in which summary data for the whole reproductive season are used, while in our calculation a slightly modified method was used (see p. 40). When we computed these reproductive parameters using the same procedure as Pelikán (l.c.) the production of newborns per adult female and season increased due to unproportional distribution of the material collected during different months of the reproductive season (5.97 litters, 29.9 newborns). By the above method we computed these parameters also for North German and North Bohemian populations using data given by Judes (1979) and Bejček (1979), respectively. Resulting values were extremely high for the former (5.91 litters, 38.4 newborns) and low for the later (3.08, 14.9) population.

Imes & Millar (1987) compared estimates of the number of litters produced per female and season based on proportions of pregnant females in removal samples in three North American rodents with those obtained by the more precise method based on births documented on mark-recapture grids. Both methods produced values close to each other. Nevertheless, it is to be remarked here, that precision of such estimates is rather limited, because the breeding intensity should be influenced, e. g., by temporal oscillations in abundance, cohort dynamics and behavioural parameters in the populations.

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### BOOK REVIEW

BEGON M., HARPER J. L. & TOWNSEND C. R.: *Ökologie, Individuen, Populationen und Lebensgemeinschaften*. Birkhäuser Verlag, Basel, Boston, Berlin 1991. XXV + 1024 pages. Format 165 x 260 mm. Price hardcover sFr 148.00 or DM 168.00. ISBN 3-7643-1976-8.

The presented volume introduces the second revised edition of the original "Ecology, Individuals, Populations and Communities" (Blackwell Scientific Publications, Oxford 1990) translated into German by D. Schwoeder and Beate Hülsen. The volume is organized into four parts consisting of 24 chapters. The text is extensively augmented by numerous tabular reviews and two-coloured figures including line drawings, photographs of animals, plants and landscapes, electron micrographs, diagrams and charts. A considerable number of pages is provided with marginal glosses which constitute vivid references to the text.

Part one on organisms deals with various aspects of conformity of organisms and the environment, and with food and nourishment resources. Part on interrelationships is concerned with intraspecific and interspecific competitions, with the nature of decomposers and detritivores, with predation, parasitism and mutualism. Part three entitled "Three Reviews" discusses the life cycles, the frequency of organisms and its active modifications. Part four on communities describes populations of various animal species, their composition and peculiarities, and habitat colonization, stability and structure of communities, and the abundance of species. Finally, there is a glossary of ecological key terms, comprehensive list of references, and specific and subject indexes. Moreover, there is a separate supplement of additional reference works.

This unique volume constitutes a most comprehensive, contemporary, and well balanced contribution to the knowledge of principles of modern ecology. It is provided with a wealth of examples characterizing the environmental processes and laws. The authors and translators offer a readable textbook to students of biology, and a vital guide to lecturers in life sciences and research scientists dealing with ecology of our days.

*Jindřich Jira*

**Distribution of the fruit tree pests *Cydia molesta*, *Cydia funebrana* and *Anarsia lineatella* (Lepidoptera: Tortricidae, Gelechiidae) in former Czechoslovakia as recorded by pheromone traps**

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**Oriental fruit moth, *Cydia molesta*, plum fruit moth, *Cydia funebrana*, Lepidoptera, Tortricidae, peach twig borer, *Anarsia lineatella*, Lepidoptera, Gelechiidae, monitoring, pheromone traps, distribution, Bohemia, Moravia, Slovakia, Central Europe**

**Abstract.** Pheromone trapping proved abundant occurrence of the oriental fruit moth, *Cydia molesta* in Slovakia and southern Moravia in 1976 and 1977. An extensive field research was carried out in 1980, 1981, 1985 (Bohemia and Moravia) and in 1987 and 1988 (Slovakia) and the occurrence of *C. molesta* as well as the plum fruit moth, *Cydia funebrana* and the peach twig borer, *Anarsia lineatella* was mapped by pheromone trapping. *C. molesta* occurs in warm and moderately warm regions of Czechoslovakia, being most abundant in southern Moravia and Slovakia in areas with large commercial peach orchards. The westernmost limit of the occurrence of *C. molesta*, indicated by single captures, is at the level of the towns Most, Rakovník, Písek, České Budějovice. The distribution areas of *C. funebrana* and *A. lineatella* are larger, as these species occur at localities where *C. molesta* has never been found.

#### INTRODUCTION

The plum fruit moth, *Cydia funebrana* (Treitschke) and the peach twig borer, *Anarsia lineatella* Zeller are common pests of stone fruit in Central Europe including former Czechoslovakia (Miller 1956). However, the oriental fruit moth, *Cydia molesta* (Busck) was considered a quarantine pest in Czechoslovakia until recently, although findings of its specimens in Austria (Böhm O. 1957, Böhm H. 1976) and Hungary (Bodor & Reichart 1969) could be regarded as indications for its occurrence also in Czechoslovakia. We should add here that Povolný (1951) reared two *C. molesta* from larvae till adult emergence during his studies of the lepidopteran fauna on fruit trees in southern Moravia, but this was never published. Larger numbers of *C. molesta* were for the first time found in Czechoslovakia in samples caught in pheromone traps baited with *Cydia funebrana* (CF) and *C. molesta* (QFM) lures in 1976 (Hrdý & Krampl 1977). Subsequently, the occurrence of *C. molesta* in Czechoslovakia was mapped in 1977 (Hrdý, Krampl & Kuldová 1979). Details on the map showing the occurrence of *C. molesta* and *C. funebrana* determined by the monitoring carried out in 1976 (Fig. 2) can be found in Hrdý, Krampl et al. (1979). Because this paper is in Czech we repeat the basic data here (see also Tab. 1):

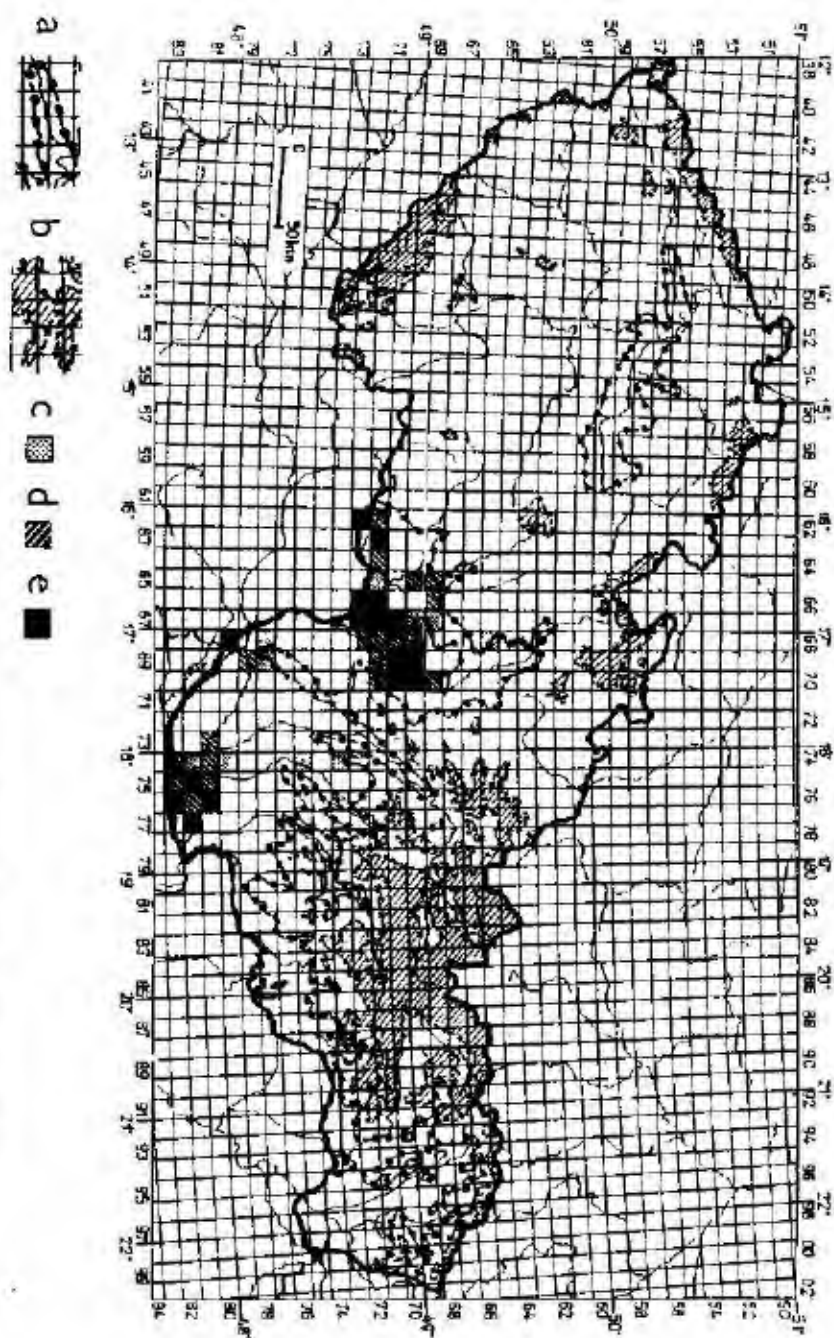


Fig. 1. a - warm and b - cool regions in Czechoslovakia. The rest of the territory is moderately warm (Sýrový 1958). Commercial plantations of peach trees according to the Federal Statistics Office, data from Bohemia and Moravia in 1987, Slovakia 1988. Sizes of orchards in the given square of the grid mapping system: c - less than 10 ha, d - 10 to 15 ha, e - more than 15 ha.

The active compounds were welded into polyethylene capillaries. Attractant C contained 98.8 % of Z8-12:Ac and 1.2 % of E8-12:Ac. Attractant CT contained 93 % of Z8-12:Ac and 7 % of E-isomere. *C. funebrana* males were more attracted to C, attractant CT was somewhat more effective with *C. molesta*. Several data on the occurrence of *C. molesta* and its bionomics in Czechoslovakia were published by Blaha & Povolný (1972), data from Slovakia were published by Barabás (1987). Hrdý, Marek et al. (1979) reported captures of target species *C. molesta* and *C. funebrana* and also captures of other, non-target species, during their study of the specificity of OFM and CF lures.

We investigated the distribution of *C. molesta* again on a larger scale in 1980-1988. The attractants we used, i.e. mixtures of (Z)-8-dodecen-1-yl acetate (Z8-12:Ac) and (E)-8-dodecen-1-yl acetate (E8-12:Ac), are attractive to both *Cydia* species. The main components of the *C. molesta* sex pheromone have been identified by Roelofs et al. (1969) and Briwer & Descouts (1978), and they have been known to attract *C. funebrana* males, too (cf. e.g. Am et al. 1992). A detailed analysis of the *C. funebrana* sex pheromone was made only a few years ago (Guerni et al. 1986).

As *C. molesta* is a new pest for Czechoslovakia and until recently all damage to shoots and fruits of the peach trees in Czechoslovakia was ascribed to *A. lineatella*, we included its monitoring in our tests as well as monitoring of the common Central European pest *C. funebrana*.

#### MATERIALS AND METHODS

For the monitoring of *C. molesta* and *C. funebrana* in Bohemia and Moravia in 1980, 1981 and 1985 we used the Atrialol pheromone dispensers made in the Institute of Chemistry at Cluj Napoca, Romania, and OFM dispensers from Zoecon (Zoecon Corp., Phercon Supply Service, Palo Alto, CA USA) and from Albany (Albany, Controlled Release Division, Needham Heights, MA USA). In 1987 and 1988 in Slovakia dispensers were used from the Research Institute for Plant Protection at Wageningen, The Netherlands and from Farming Cooperative AK Slušovice, Czechoslovakia. All these dispensers contained mixtures of Z8-12:Ac and E8-12:Ac. For the monitoring of *A. lineatella* PTB Zoecon and PTB Albany dispensers containing a mixture of (E)-5-decen-1-ol (E5-10 OH) and (E)-5-decen-1-yl acetate (E5-10:Ac) were used.

In 1980 and 1981 we used Stuttgart traps made from flower pots (Neuffer 1974), later on Etokap plastic pipe traps made by Chemika in Bratislava, Czechoslovakia and Delta cardboard traps. The sticky material in these traps was either Bird Tanglefoot (Tanglefoot Comp., Grand Rapids, MI USA) or Chemflor (Chemika).

Traps were primarily installed in peach orchards, and in areas where peaches are not grown on a large scale, in mixed orchards. The OFM, CF, and PTB attractant mixtures were exposed mostly in two separate traps at each locality for about four weeks in June-July, that is at the time of flight of adults of the target species (Hrdý, Krumpal et al. 1979, Hrdý, Kuldová et al. 1990, Povolný 1982, Molnár 1984, Novák & Hrdý 1985). Because of the large

Table 1. Number of localities inspected (number of localities with positive findings), number of identified males of the target species

Species / Year	Bohemia and Moravia			
	1977	1980	1981	1985
<i>C. molesta</i>	21 (7) 142	75 (8) 17	76 (4) 34	84 (31) 204
<i>C. funebrana</i>	21 (21) 3352	75 (67) 11285	76 (65) 5535	84 (81) 7235
<i>A. lineatella</i>	-	-	74 (22) 1410	86 (74) 972
Species / Year	Slovakia			
	1977	1987	1988	Total moth
<i>C. molesta</i>	16 (16) 976	62 (36) 1162	6 (5) 1359	3894
<i>C. funebrana</i>	16 (16) 734	62 (61) 4856	6 (6) 487	33491
<i>A. lineatella</i>	-	-	-	2382



extent of the study it was impossible to install traps at the same time, which was not really necessary considering the aim of the study and the different climatic conditions of the various areas involved in the tests.

From most of the large catches samples of about 50 specimens and in the other cases all specimens were identified. The identifications were based on male genitalia. Data on the number of localities and identified moths are summarized in Table 1. In total, we examined and identified 39,767 moths of the 3 target species and many other non-target lepidopterans.

Records of *C. molesta*, *C. funebrana* and *A. lineatella* have been plotted in maps in accordance with the international grid-mapping system which is recommended for publishing Faunistic Records from Czechoslovakia (Anonymus 1983; Novák 1989).

## RESULTS AND DISCUSSION

### Climate, peach and plum orchards

The map of former Czechoslovakia (Fig. 1) showing warm and cool regions was made according a climatic atlas by Syrový (1958). The warm region is characterized by the rate of over 50 summer days (i.e., days with maximum temperatures at least of 25°C) per year and by winter rye harvest beginning before 15 July. Average temperature in January is reported to be above -3°C (or between -3°C and -5°C). The cool region in Bohemia and Moravia has an average July temperature below 15°C, and in the Beskids (a part of eastern Moravia) and in Slovakia below 16°C. The rest of the territory is moderately warm, with the following basic characteristics: less than 50 summer days per year, start of winter rye harvest after July 15, July temperature above 15°C in Bohemia and Moravia and above 16°C in the Beskids and Slovakia.

Commercial peach plantations are concentrated in the warm region in southern Moravia (Brno, Znojmo, Břeclav, Hodonín and Uherské Hradiště districts) and near Bratislava and Ko-

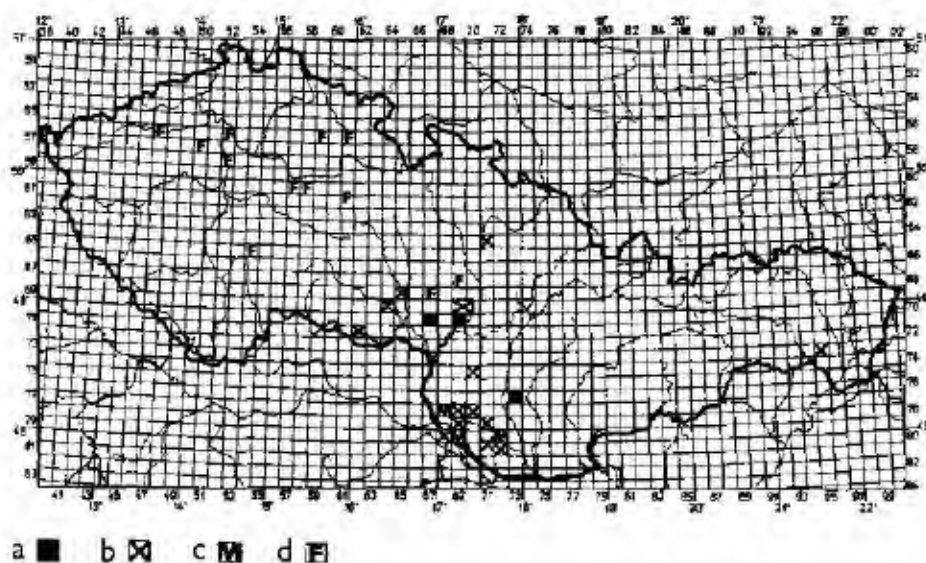


Fig. 2. Distribution of *Cydia molesta* and *C. funebrana* in 1977 (after Hrdý, Krampl et al. 1979). a - first recorded findings of *C. molesta*, b - *C. molesta* present, but less than 80% of total sample with *C. funebrana*, c - *C. molesta* present, more than 80% of total sample with *C. funebrana*, d - *C. funebrana* only.



mámo in Slovakia. Squares with large peach plantations are marked in the map (Fig. 1) according to data of the Federal Statistics Office for 1987 (Bohemia and Moravia) and 1988 (Slovakia). Plantations belonging to farming cooperatives and state farms have been recorded, data on small private orchards were not available.

Plum, damson and their cultivars are the main hosts of *C. funebrana* and are grown throughout Czechoslovakia except for mountains (above 800 m). Plum growing has been badly affected by reduction of orchards due to plum pox, and new orchards of tolerant cultivars have been planted only recently.

#### Occurrence and distribution of *Cydia molesta*

The first findings of *C. molesta* in Czechoslovakia - the one of Povolný (not published) and the mass occurrence ascertained by Hrdý and Kratopl (1977) have been indicated on the map (Fig. 2). In 1977 *C. molesta* was found in samples from pheromone traps at all localities in Slovakia and at most localities in Moravia. In choosing the localities for monitoring we preferred areas where peaches are grown, and there in three cases (M) *C. molesta* males conspicuously prevailed over *C. funebrana* (> 80 %) in the samples. We consider the quantitative data as preliminary because of different terms of exposure of the traps and different kinds of dispensers used in the individual years. In the first detailed investigation in Czechoslovakia (1977), the westernmost locality where *C. molesta* occurred was Veselčsko u Přerova in Moravia (code of the grid square 6471). No *C. molesta* was found in Bohemia despite the fact that traps had been placed at twelve localities (in different squares of the grid), largely in the warm Elbe Basin.

During the monitoring in 1980, 1981 and 1985 (Bohemia and Moravia) and in 1987 and 1988 (Slovakia), *C. molesta* was found not only in Slovakia and Moravia but also in Bohemia. According to these data (Fig. 3), *C. molesta* occurred at the following westernmost localities: Chrámec (5548) where 1 *C. molesta* male was identified along with 16 *C. funebrana* males from a trap placed in a pear orchard. Eight *C. molesta* males (with 34 *C. funebrana* males in the same trap) and 8 *C. molesta* males (plus 65 *C. funebrana* males) were captured in mixed orchards (plum, damson, cherry) at Hředle and Milý near Rakovník (5848), respectively. In southern Bohemia were captured 3 *C. molesta* males (with 53 *C. funebrana* males in the same trap) at Písek (6650) and 1 *C. molesta* male (plus 152 *C. funebrana* males) at Vráhce (7052) near České Budějovice. Evidently, these were rare captures of *C. molesta*. Data summarized in the map (Fig. 3) show that *C. molesta* regularly occurs in warm and moderately warm regions of Czechoslovakia. Large catches, with *C. molesta* making up over 80 % of the samples, were only made in warm regions of southern Moravia and Slovakia where there are large commercial peach orchards (Fig. 1). Because of a lack of detailed data on the occurrence of *C. molesta* in Czechoslovakia prior to our investigations it is impossible to confirm a presumption which seems likely, i.e., that the actual common occurrence of *C. molesta* at many localities is due to the planting of individual peach trees in small gardens in areas where peaches were not grown in the past.

Data on localities where *C. molesta* was found and other information about monitoring in Bohemia and Moravia are available at The Central Checking and Testing Institute of Agriculture, Brno (Ing. J. Marek), and these from Slovakia at The Central Checking and Testing Institute of Agriculture, Bratislava (Dr. L. Barabás).

#### Distribution of *Cydia funebrana*

Our investigations have confirmed that *C. funebrana*, a chronic pest of plums and damsons, is distributed throughout Czechoslovakia (Figs. 2, 3). In catches of the target species in traps

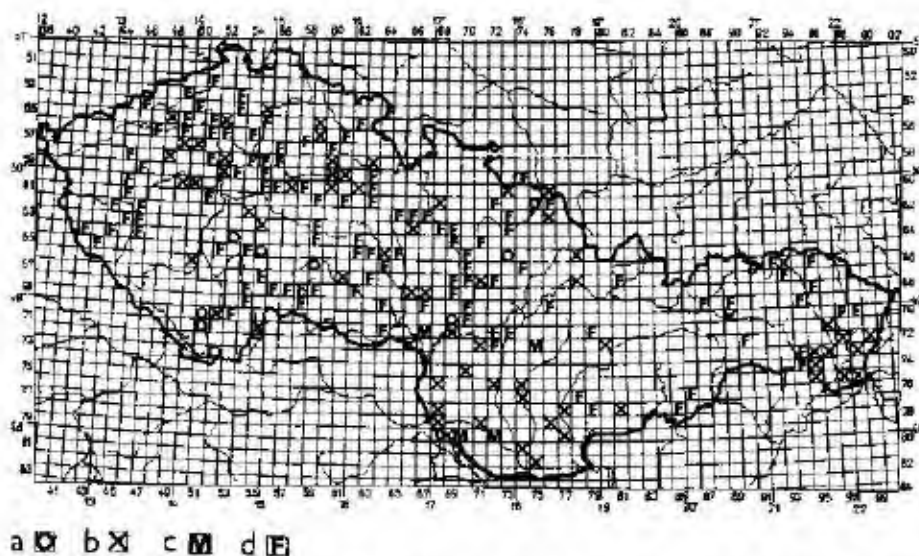


Fig 3 Distribution of *C. molesta* and *C. funebrana* according to the results of field research in 1980, 1981 and 1985 (Bohemia and Moravia) and in 1987 and 1988 (Slovakia) a - traps where no specimens of the target species *C. molesta* and *C. funebrana* were caught, b - *C. molesta* present, but less than 80 % of total sample with *C. funebrana*, c - *C. molesta* present, more than 80 % of total sample with *C. funebrana*, d - *C. funebrana* only

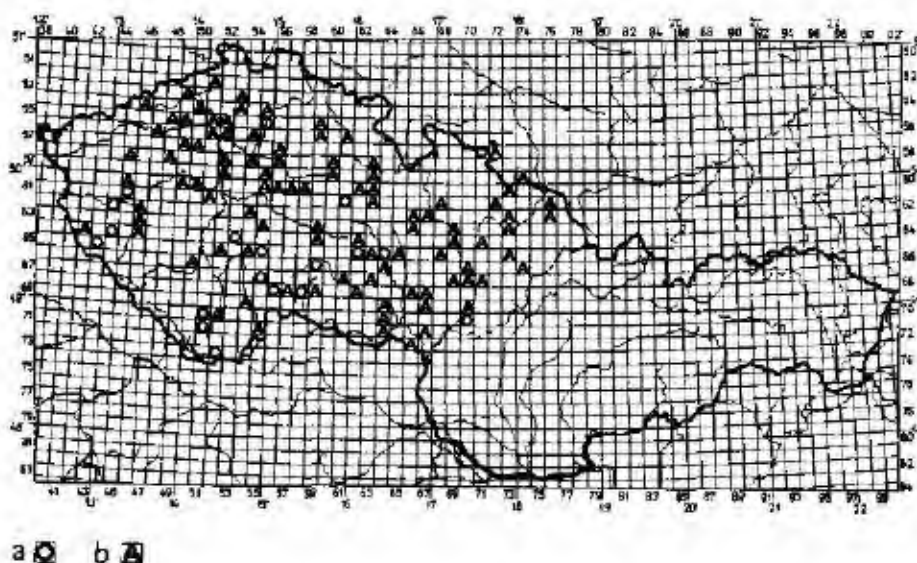


Fig 4 Distribution of *Anarsia lineatella* in Bohemia and Moravia according to the results of field research in 1981 and 1985 a - *A. lineatella* absent from the traps, b - *A. lineatella* present

baited with the binary mixture of Z8-12:Ac + E8-12:Ac there were with one exception always males of *C. funebrana*. The same we observed also in cases when the traps were exposed in large peach orchards in areas where peaches and apricots are the most common stone fruits.

#### Distribution of *Anarsia lineatella*

According to the results of research carried out in 1981 and 1985, *A. lineatella* is almost as common as *C. funebrana* in Bohemia and Moravia. Compared with *C. molesta* (cf. maps in Figs. 2 and 3) *A. lineatella* (Fig. 4) is more widely distributed, occurring in areas where there have not been any records of *C. molesta*.

In our opinion, infestation of the fruit and shoots of critical stone fruit species - peach, plum, damson and apricot - should be monitored and the proportions of damage caused by *C. molesta*, *A. lineatella* and *C. funebrana* should be assessed. Findings on the distribution of *C. molesta* in Czechoslovakia and in the neighbouring Austria and Hungary give no longer any grounds for considering *C. molesta* a quarantine pest. Also, according to our opinion, it would be useful to repeat the monitoring of distribution of *C. molesta* after the next 10 - 20 years and to investigate potential infestation of other fruit tree species by this pest.

#### Non-target species

In 1977, in addition to the targets *C. molesta* and *C. funebrana*, we recorded many other tortricids in traps baited with the binary mixture of Z8-12:Ac + E8-12:Ac (where the Z-isomere markedly prevailed), for example, *Celypha striana* (Denis & Schiffenmüller), *Cnephasia genitalana* Pierce & Metcalfe, *Cnephasia stephensiana* (Doubleday), *Cydia tenebrosana* (Duponchel), *Enarmonia formosana* (Scopoli), *Epiblema scutulana* (Denis & Schiffenmüller), *Pammene fasciana* (L.) and *Pammene* spp. Other moths responding to this attractant were recorded during field screening of different pheromone lures (Hrdý, Krampl et al. 1979; Hrdý et al. 1989). In contrast, pheromone dispensers with E5-10:OH and E5-10:Ac rarely attracted other moths than the target *A. lineatella* (Hrdý et al. 1989). During *A. lineatella* monitoring in Bohemia and Moravia, the most numerous (139 males) of the non-target species in the traps was *Diachrysa chrysis* (L.) (Noctuidae), Z5-12:Ac + Z7-10:Ac has been reported as an attractant, or optimized attractant blend for this species. All the other major catches included noctuids: *Mesapamea secalis* (L.) for which there had been preliminary reports of a Z11-14:OH + E11-14:OH mixture as attractant, and another two species, *Mamestra suasa* (Denis & Schiffenmüller) and *Apamea monaglyphia* (Hufnagel), for which Z11-16:Ac and Z11-16:Aldehyde proved to be attractants (analytically identified as pheromones later). Data on the attractants have been taken over from Arn et al. (1992). We are not ready to speculate whether such common captures of non-target species were due to impurities in the compounds, or erroneous responses of the males, or whether the compounds applied are true attractants for the non-target species. *Hypena proboscidalis* (L.) was another major catch, but we have no comments on the relation of that findings to the attractants we used, because in our experience this species has been caught occasionally in traps with various attractants. We do not mention in this publication single captures of several other species.

#### Acknowledgements

Quarantine and plant protection supervisors from the Central Checking and Testing Institute of Agriculture and other volunteers took part in the field research. We thank all of them for their assistance.

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*Scorpiops irenae* sp. n. from Nepal and *Scorpiops hardwicki jendeki*  
subsp. n. from Yunnan, China (Arachnida: Scorpionida: Vaejovidae).

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**Taxonomy, descriptions, Scorpionida, Vaejovidae, Scorpiops, Nepal, China.**

**Abstract.** *Scorpiops* (*Scorpiops*) *irenae* sp. n. from Nepal differs from other species of the subgenus *Scorpiops* Peters, 1861 in the distribution of trichobothria on the external surface of the patella and in having only 5-6 pectinal teeth. It is the only species of the genus with merely 3 trichobothria on the ventral surface of the manus. *Scorpiops* (*Scorpiops*) *hardwicki jendeki* subsp. n. from Yunnan differs from other subspecies of *S. hardwicki* in the distribution of trichobothria on the chelae and their number (6) on the ventral surface of the patella, and in having only 4, or exceptionally 5, pectinal teeth of distinctly uneven size. It is the first representative of the genus *Scorpiops* reported from the Yunnan Province.

*Scorpiops* (*Scorpiops*) *irenae* sp. n. (Figs. 1-6, Table 1)

**HOLOTYPE** A female 51.3 mm long, leg. J. Probst, 7 June 1992, under a dry log, deposited in my collection. No other material.

**TYPE LOCALITY** Chichila Mure, elevation 2050 m, Arun Valley, east Nepal.

**ETYMOLOGY** Named after my wife Irena.

**DESCRIPTION** The new species is characterized by its dimensions and proportions (Table 1), by the number and distribution of trichobothria on the ventral surface of the manus (Figs. 1-3) and the patella (Figs. 4-6), and by the number of pectinal teeth (Table 1). There are 3 trichobothria on the ventral surface of the manus and 6 on the ventral surface of the patella. The teeth number 6 in the left pectine and 5 in the right pectine. The specimen is black except for the chelae and telson which are dark reddish brown, and tarsomere II which is lighter reddish brown.

**AFFINITIES** Vachon (1980) divided the genus *Scorpiops* into four subgenera in two groups and characterized the subgenus *Alloscorpiops* Vachon, 1980 by 10-12 trichobothria on the ventral surface of the manus, and the subgenera *Neoscorpiops* Vachon, 1980, *Scorpiops* Peters, 1861 and *Euscorpiops* Vachon, 1980 by 4 trichobothria on the ventral surface of the manus. *S. irenae* sp. n. is the only species of the genus with merely 3 trichobothria on the ventral surface of the manus (Fig. 3), but due to the numbers and distribution of other trichobothria, I nevertheless regard it as belonging in the subgenus *Scorpiops*.

The distribution of trichobothria on the external surface of the patella (Fig. 5) also differentiates *S. (S.) irenae* sp. n. from all other species of the subgenus (cf. Vachon 1980, Tikader & Bastawade 1983, Kovářek 1993).

*S. irenae* sp. n. is one of the larger of the subgenus (cf. Table 1), reaching a size similar to *S. crassimanus* Pocock, 1899, *S. montanus* Karsch, 1879, *S. petersi* Pocock, 1893 and *S. tibetanus* Hirst, 1911. However, these species have 8, 13-18, 7 and 7 trichobothria, respectively, on the ventral surface of the patella, whereas *S. irenae* sp. n. has only 6 trichobothria in that

position. *S. tibetanus* has 7-8 pectinal teeth (Hirst 1911), whereas *S. irenae* sp. n. has only 5-6.

*Scorpiops (Scorpiops) hardwickei jendeki* subsp. n. (Figs. 7-13, Table 1)

YPES. Holotype (a female) and five paratypes (females nos. 1-5), all leg. E. Jendek and O. Sausa 14-21. VI. 1993. Paratype no. 1 has been deposited in the invertebrate zoology collection of the Czech National Museum (Natural History), Prague; all other types are in my collection.

TYPE LOCALITY. Gaoligongshan Nature Reserve 100 km west of Baoshan, Yunnan Province, China. The holotype and paratypes are from the same locality.

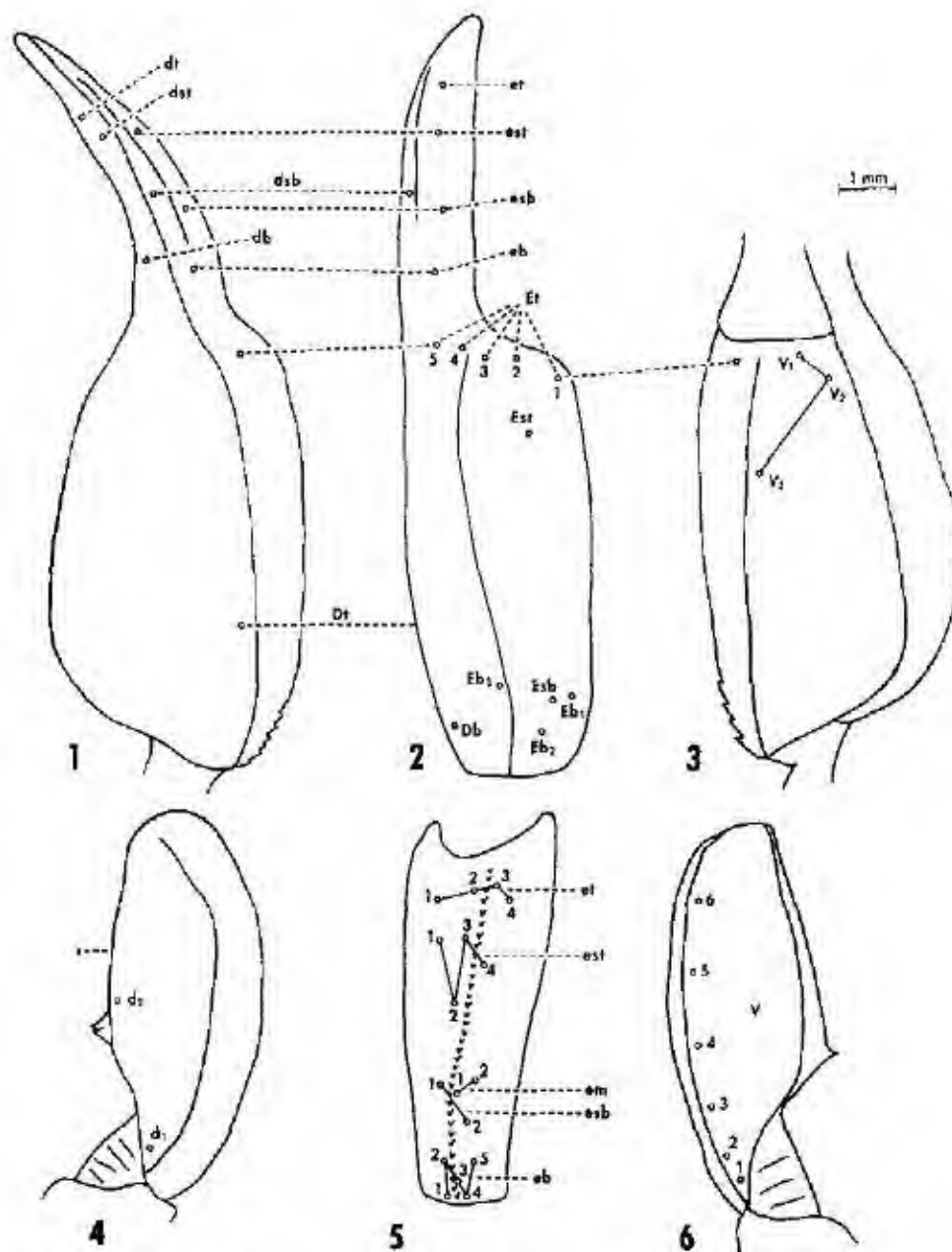
ETYMOLOGY. Named after the Slovak entomologist Eduard Jendek, who has collected a majority of the specimens.

DESCRIPTION. The new subspecies is characterized by its dimensions (Table 1), by the distribution of trichobothria on the chelae (Figs. 7-9) and their number on the ventral surface of the

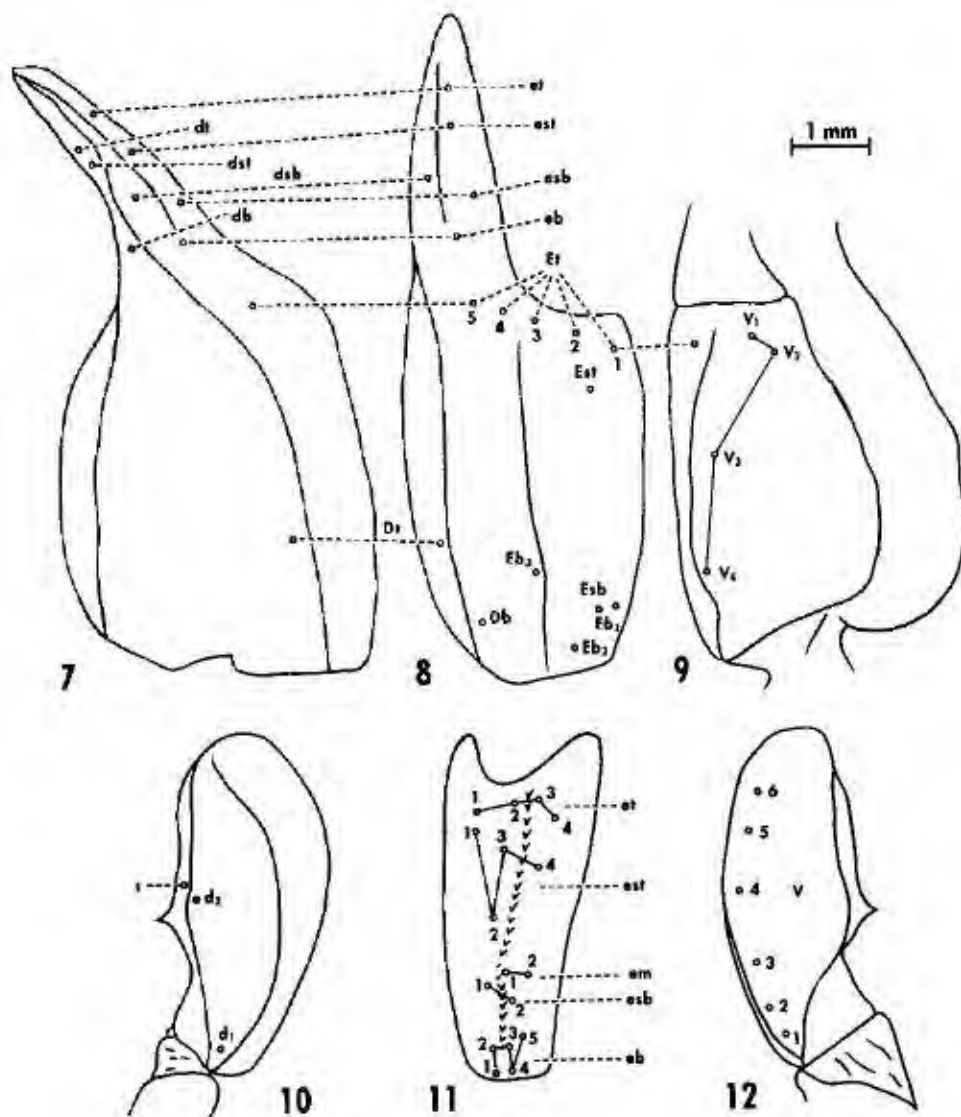
Table 1. Measurements in millimeters of the species described. Column denoted 'Pectinal teeth' contains numbers of both left and right teeth separated by a colon

		<i>S. (Scorpiops)</i> <i>irenae</i> sp. n. holotype	<i>S. (Scorpiops)</i> <i>hardwickei</i> <i>jendeki</i> ssp. n. holotype	<i>S. (Scorpiops)</i> <i>hardwickei</i> <i>jendeki</i> ssp. n. paratype no. 4
Total	length	51.3	42.1	37.9
Carapace	length	7.3	5.1	4.7
	width	7.8	5.9	5.5
Metasoma	length	25.2	20.1	18.2
	segment I	2.5	2.1	1.9
segm. II	width	3.1	2.6	2.4
	length	3.0	2.5	2.2
segm. III	width	2.6	2.3	2.1
	length	3.3	2.6	2.4
segm. IV	width	2.2	2.1	2.0
	length	3.8	3.1	2.8
segm. V	width	2.2	2.1	1.9
	length	6.2	5.4	4.7
telson	width	2.2	2.0	1.8
	length	6.4	4.8	4.5
Pedipalp				
femur	length	7.5	4.2	3.9
	width	2.5	1.6	1.5
patella	length	7.0	4.4	4.0
	width	2.7	1.8	1.7
tibia	length	14.1	8.3	7.9
manus	length	8.6	5.1	4.8
	width	4.5	3.8	3.6
finger m.	length	7.5	4.6	4.5
Pectinal	teeth	6:5	4:4	4:4





Figs 1-6. *Scorpiops (Scorpiops) irenae* sp. n. female holotype. In Figs 1-3 the first capital letters denote trichobothria on the manus; the first lower case ones are those situated on the fixed finger of the pedipalp. Figs 4-6 show the distribution of trichobothria on the patella of the pedipalp. Explanation: First letters: V, ventral; D, dorsal; E, external. Second or second plus third letters: b, basai; sb, suprabasal; m, medial; st, subterminal; t, terminal. Numerals distinguish individual trichobothria of the same classification. Designation and description of trichobothria according to Vachon (1973, 1980).



Figs 7-12 *Scorplops (Scorplops) hardwicki jendeki* subsp. n. holotype. In Figs. 7-9 the first capital letters denote trichothria on the manus, the first lower case ones are those situated on the fixed finger of the pedipalp. Figs 10-12 show the distribution of trichothria on the patella of the pedipalp. Explanation: First letters: V, ventral, D, dorsal, E, external. Second or second plus third letters: b, basal, sb, suprabasal, m, medial, st, subterminal, t, terminal. Numerals distinguish individual trichothria of the same classification. Designation and description of trichothria according to Vachon (1973, 1980).

patella (Figs. 10-12), and by the number and respective sizes of the pectinal teeth (Table 1, Fig. 13). There are 6 trichobothria on the ventral surface of the patella and 4, or exceptionally 5, pectinal teeth of uneven size. The specimens are black except for the chelae and telson which are reddish brown, and tarsomere II which is yellow to orangish yellow on all legs.

**VARIABILITY.** Compared with the holotype, in three of the paratypes the distribution of trichobothria on the external surface of the patella (Fig. 11) is somewhat different and in one the trichobothria are absent. However, in all of them this concerns either only the left or right pedipalp, not both in the same specimen. Paratype no. 2 lacks trichobothria esb on the right pedipalp. Paratype no. 3 has trichobothrium est 1 on the left pedipalp out of position, nearly touching trichobothrium et 1. Paratype no. 4 has trichobothrium em 2 on the left pedipalp out of alignment

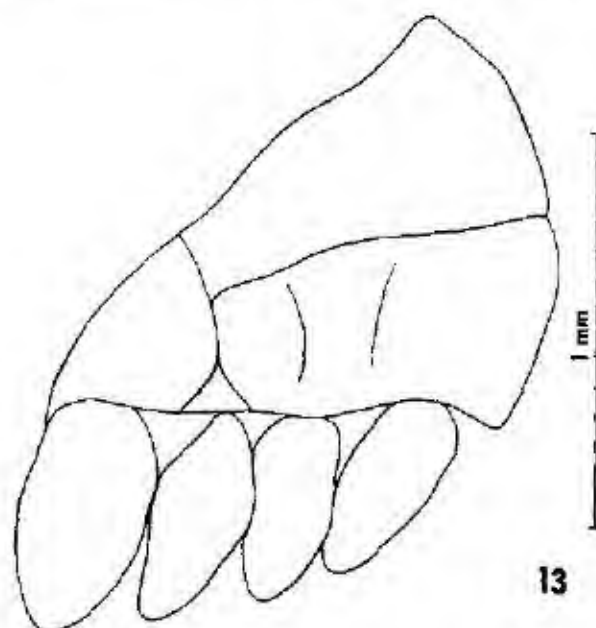


Fig. 13. *Scorpiops (Scorpiops) hardwicki jendeki* subsp. n. Pectinal teeth.

so that the line between em 1 and em 2 runs parallel to the esb 1 - esb 2 line; this paratype also has the apex of the outermost pectinal tooth split into two tips, but the split does not reach anywhere near the tooth base. Paratype no. 5 has trichobothrium est 4 on the right pedipalp situated closer to et 4 than in the holotype, whereas em 2 is in the same position as in paratype no. 4; this paratype (no. 5) is the only specimen that has 5 teeth in the left pectine.

**AFFINITIES.** Species of the subgenus *Scorpiops* are best distinguished by the number of trichobothria on the ventral surface of the patella. The numbers are as follows: 13-18 in *S. montanus* Karsch, 1879 (Vachon 1980), 10 in *S. pochmarhicus* Bastawade, 1992 (Bastawade 1992), 9 in *S. oligotrichus* Fage, 1933 and *S. farkaci* Kovářík, 1993 (Kovářík 1993), 8 in *S. crassimanus* Pocock, 1899 (Tikader & Bastawade 1983), 7 in *S. leptochirus* Pocock, 1893 (Tikader & Bastawade 1983), *S. petersi* Pocock, 1893 (Pocock 1893), *S. rohtangensis* Mani, 1959 (Mani 1959) and *S. tibetanus* Hirst, 1911, and 6-7 in *S. hardwicki* Gervais, 1844.

Kraepelin (1913) placed *S. affinis* Kraepelin, 1898 and *S. insculptus* Pocock, 1900 as subspecies in *S. hardwicki*, and Vachon (1980) concurred with that assignment. Tikader & Bastawade (1983) did not accept Kraepelin's (1913) subspecies, and, moreover, placed *S. austerus* Hirst, 1911 into synonymy of *S. affinis* (= *S. h. affinis*). The subspecies *S. h. insculptus* invariably has 7 trichobothria on the ventral surface of the patella (Hirst 1911, Tikader & Bastawade 1983), the remaining subspecies have 6-7 trichobothria in that position.

*Scorpiops hardwicki jendeki* subsp. n. differs from other subspecies of *S. hardwicki* in having only 4, or exceptionally 5, pectinal teeth of distinctly uneven size (Fig. 13). Tikader & Bastawade (1983) used the length/width ratio of pectinal teeth to differentiate between *S. hardwicki* and *S. insculptus* (= *S. h. insculptus*), with the teeth 2.75 times longer than wide in the former and only twice longer than wide in the latter. In *S. h. jendeki* subsp. n. the first (medial) pectinal tooth is 1.38-1.75 times longer than wide and the fourth lateral tooth is 1.4-1.9 times longer than wide. Other differences can be seen in individual dimensions (Table 1), distribution of trichobothria (Figs 7-12) and the papers cited.

*S. h. jendeki* subsp. n. is the first representative of the genus *Scorpiops* reported from the Yunnan Province.

#### Acknowledgements

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**Seasonal activity and habitat associations of Silphidae and Leiodidae:  
Cholevinae (Coleoptera) in central Bohemia**

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**Seasonal activity, habitat associations, trap efficiency, Silphidae, Leiodidae, Cholevinae, Coleoptera, central Bohemia**

**Abstract.** Fourteen species of Silphidae and 20 species of Leiodidae: Cholevinae were collected in the Velký Blaník Protected Landscape Area (central Bohemia) on 4 forest and on 3 field habitats, in 1986 and 1987. Pitfall traps unbaited or baited with fish meat and ripen cheese were used. Seasonal activities, abundance of teneral adults and habitat associations are given for abundant species.

**INTRODUCTION**

The two groups studied, Silphidae and Leiodidae: Cholevinae, are important members of beetle community on carrion (Shubeck et al. 1981).

The synecology of carrion beetles (Silphidae) was studied by many authors. Some notes about habitat preferences were given by Grinfel'd (1948) from Russia, Kursk region. Succession of burying beetles on carrion in southern Poland was studied by Mroczkowski (1949). Other small papers were summarized in Petruška (1964) and Anderson (1982). Ecology of several central European species were studied in fields of northern Moravia by Novák (1965, 1966), Petruška (1966) and Špicarová (1969). Data on habitat preferences and seasonality in central Europe were also given in the key of Šustek (1981). Colonisation of Silphidae on young dune islands in northern Germany was studied by Plaisier (1988). The occurrence of carrion beetles on crop fields in northwestern Poland and the efficiency of various types of baited pitfall traps was evaluated by Kaminska (1989). Seasonal activity and habitat preferences of North American species were discussed by Anderson (1982) and Anderson & Peck (1985), who also give many references to other papers concerning North American fauna.

On the other hand, there are only few papers dealing with ecology of small carrion beetles (Leiodidae: Cholevinae). Some elementary information was provided by Sokolowski (1942) for species from northern Germany. Seasonal activity and habitat preferences were studied in central Germany (Plath & Witzke 1972) and northern Moravia (Majer 1980). Topp & Engler (1980) and Engler (1982) dealt with the seasonal dynamics of species in a beech forest in northern Germany. The habitat preferences and seasonal dynamics of North American species in southern Ontario was recently studied by Peck & Anderson (1985) and by Chandler & Peck (1992). The former paper reviews several older papers concerning North America.

The seasonal activity and altitudinal distribution of both Silphidae and Leiodidae: Cholevinae were studied in northern Italy (Zoia 1990) and Japan (Kamimura & al. 1964; Martin 1989, 1992).

## AREA OF STUDY

The beetles were collected at several localities in Velký Blaník Protected Landscape Area (central Bohemia), about 20 km SE of Benešov, faunistic grid mapping code 6355 after (Zelený 1972), at 450-630 m a.s.l.

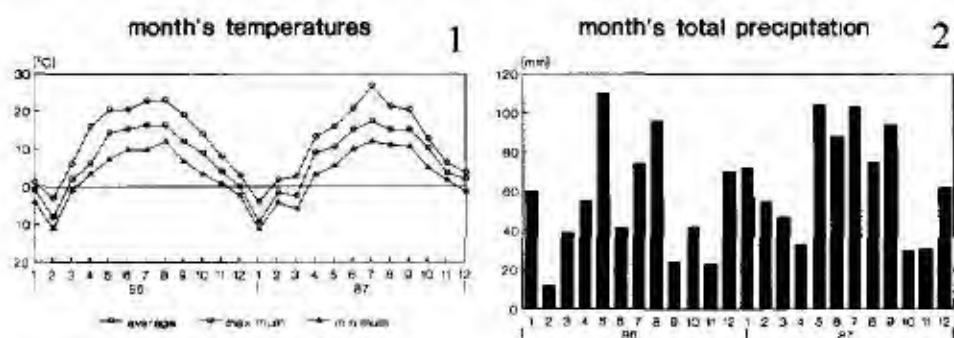
Temperature data for 1986 and 1987 (Fig. 1) were obtained from meteorological station at Čechůvce (10 km from Velký Blaník hill), precipitations (Fig. 2) were recorded in Načeradec (4 km from Velký Blaník hill).

In 1986 the material was collected at four forest sites:

- (1) Beech stand at the top of Velký Blaník hill, dry area with rock field, covered with a layer of dead leaves
- (2) Dense and dry coniferous forest (largely *Picea abies*) between Holý vrch and Velký Blaník hills
- (3) Mixed forest (*Picea*, *Betula*, and *Larix*) on the northern slope of Velký Blaník hill, moist, with a thick dead leaf layer
- (4) Moist coniferous forest at the northern foot of Velký Blaník hill, source area of a small brook with thick moss layer

In 1987 the beetles were collected at 3 non-forest sites (further called field sites):

- (5) Wet marsh at the edge of a mixed forest, with heavy soil
- (6) Edge of a maize field, a dry site with an exuberant stand of *Urtica* and *Cirsium*
- (7) Edge of a barley field and a small mixed grove (largely *Carpinus*), dry and warm site



Figs 1-2 1 - the course of average, maximum and minimum monthly temperatures and 2 - average of the monthly total precipitation in 1986 and 1987 (for precise location, see text).

## MATERIALS AND METHODS

The material was collected using pitfall traps with an outlet of 10 cm diameter, 13 cm deep. The traps were filled with 1:1 solution of water and ethylene glycol (Anderson 1982). Nine traps were placed on each locality, three unbaited, three baited with fish meat and three baited with ripen cheese. The traps were serviced at 2-4 weeks intervals, 15 times (22 iii - 5 xii) in 1986, and 12 times (5 iv - 5 xii) in 1987. The material was placed into 75 % ethanol or dry mounted and deposited in the author's collection. Classification follows the papers of Szymozkowski (1961, 1971) and Šustek (1981).

## RESULTS

In total I collected 9845 individuals of 14 species of Silphidae and 8906 individuals of 20 species of Cholevinae (Table 1).

### 1. Trap efficiency

The total catch and relative abundance of different taxa in unbaited and baited traps differed largely (Table 2).



Table 1 Relative abundances of individual species of Silphidae and Leiodidae Cholevinae, trapped in the Velký Bláník Protected Landscape Area (central Bohemia) during 1986 and 1987

species	number of individuals		
	forest sites 1986	field sites 1987	totally 1986 + 1987
<b>Silphidae</b>			
<i>Nicrophorus vespilloides</i> Herbst, 1784	3808	856	4664
<i>Oiceoptoma thoracica</i> (Linnaeus, 1758)	1604	313	1917
<i>Nicrophorus investigator</i> Zetterstedt, 1824	1133	130	1263
<i>Nicrophorus fossor fossor</i> Erichson, 1837	494	105	599
<i>Silpha tristis tristis</i> Illiger, 1798	0	573	573
<i>Nicrophorus humator</i> Olivier, 1790	263	83	346
<i>Nicrophorus vespillo</i> (Linnaeus, 1758)	92	139	231
<i>Thanatophilus sinuatus</i> (Fabricius, 1775)	18	206	224
<i>Thanatophilus rugosus</i> (Linnaeus, 1758)	1	11	12
<i>Phosphuga atrata atrata</i> (Linnaeus, 1758)	0	9	9
<i>Nicrophorus sepulchrorum</i> Charpentier, 1825	0	2	2
<i>Neoclytus littoralis</i> (Linnaeus, 1758)	2	0	2
<i>Actiopa opaca</i> (Linnaeus, 1758)	0	1	1
<i>Xylodipea quadripunctata</i> (Linnaeus, 1761)	0	1	1
<b>Leiodidae Cholevinae</b>			
<i>Catops tristis tristis</i> (Panzer, 1794)	2572	148	2720
<i>Sciodrepoides watsoni watsoni</i> (Spence, 1815)	863	1596	2459
<i>Catops coracinus coracinus</i> Kellner, 1846	1226	45	1271
<i>Sciodrepoides fumatus fumatus</i> (Spence, 1815) and <i>S. alpestris</i> Jeannel, 1934, females	675	67	742
<i>Catops picipes</i> (Fabricius, 1792)	452	144	597
<i>Sciodrepoides fumatus fumatus</i> (Spence, 1815), males	199	63	262
<i>Sciodrepoides alpestris</i> Jeannel, 1934, males	179	16	195
<i>Catops fuliginosus fuliginosus</i> Erichson, 1837	59	87	146
<i>Catops grandicollis</i> Erichson, 1837	3	125	128
<i>Catops subfuscus subfuscus</i> Kellner, 1846	125	0	125
<i>Ptomaphagus sericatus</i> (Chaudour, 1845)	5	110	115
<i>Catops kirbyi kirbyi</i> (Spence, 1815)	55	24	79
<i>Fissocatops morio</i> (Fabricius, 1792)	0	28	28
<i>Catops chrysomeloides</i> (Panzer, 1798)	5	13	18
<i>Catops longulus</i> Kellner, 1846	5	1	6
<i>Catops nigriclavus</i> Gerhardt, 1900	3	2	5
<i>Catops nigricans</i> (Spence, 1815)	0	4	4
<i>Ptomaphagus varicornis</i> (Rosenhauer, 1847)	3	0	3
<i>Ptomaphagus subvillosus</i> (Goeze, 1777)	0	1	1
<i>Catops fuscus fuscus</i> (Panzer, 1794)	0	1	1
<i>Choleva paskoviensis</i> Reitter, 1913	0	1	1

The most effective traps were those baited with fish meat, followed by open cheese baited and unbaited traps.

Most Silphinae in forest habitats were caught with fish-baited traps while catches with other traps were low. In field habitats, more Silphinae were trapped also with cheese-baited and unbaited traps. Most Nicrophorinae in both forest and field sites were captured with fish-baited traps.

Table 2. The efficiency of differently baited traps in Siphidae, Silphinae and Nicrophorinae, and Leiodidae Cholevinae, in the Velký Bláns Protected Landscape Area (central Bohemia) on forest sites in 1986 and field sites in 1987

	forest sites (1986)			field sites (1987)				
	total number of specimens	per-cent of total catch			total number of specimens	per cent of total catch		
		fish meat	ripen cheese	un- baited		fish meat	ripen cheese	un- baited
Silphinae	1709	97.2	2.6	0.2	1115	70.1	18.1	11.8
Nicrophorinae	5790	84.3	14.1	1.6	1315	89.2	3.6	7.2
Cholevinae	6427	68.6	28.7	2.7	2477	54.3	34.1	11.6
total	13926	78.7	19.4	1.9	4907	67.4	22.2	10.4

Cheese baited traps were slightly more efficient than unbaited traps, at forest sites. The distribution of catches of Leiodidae Cholevinae was different. The highest numbers were trapped with fish-baited traps, but catches with cheese-baited traps were also high in both forest and field habitats. At field sites also unbaited traps caught significant members of cholevine beetles.

## 2. Seasonal activity

Among carrion beetles, *Thanatophilus sinuatus* was found early in the season, from April to August (Fig. 3). *Oiceoptoma thoracica* adults were trapped from April to October, with two peaks of activity in May-June and August (Fig. 4). Larvae were captured mainly in May-June (Fig. 5), first teneralis in July to August. *Silpha tristis tristis* adults were captured from June to October (Fig. 6). Larvae were captured in June to October (Fig. 7), the teneralis appeared in August to October.

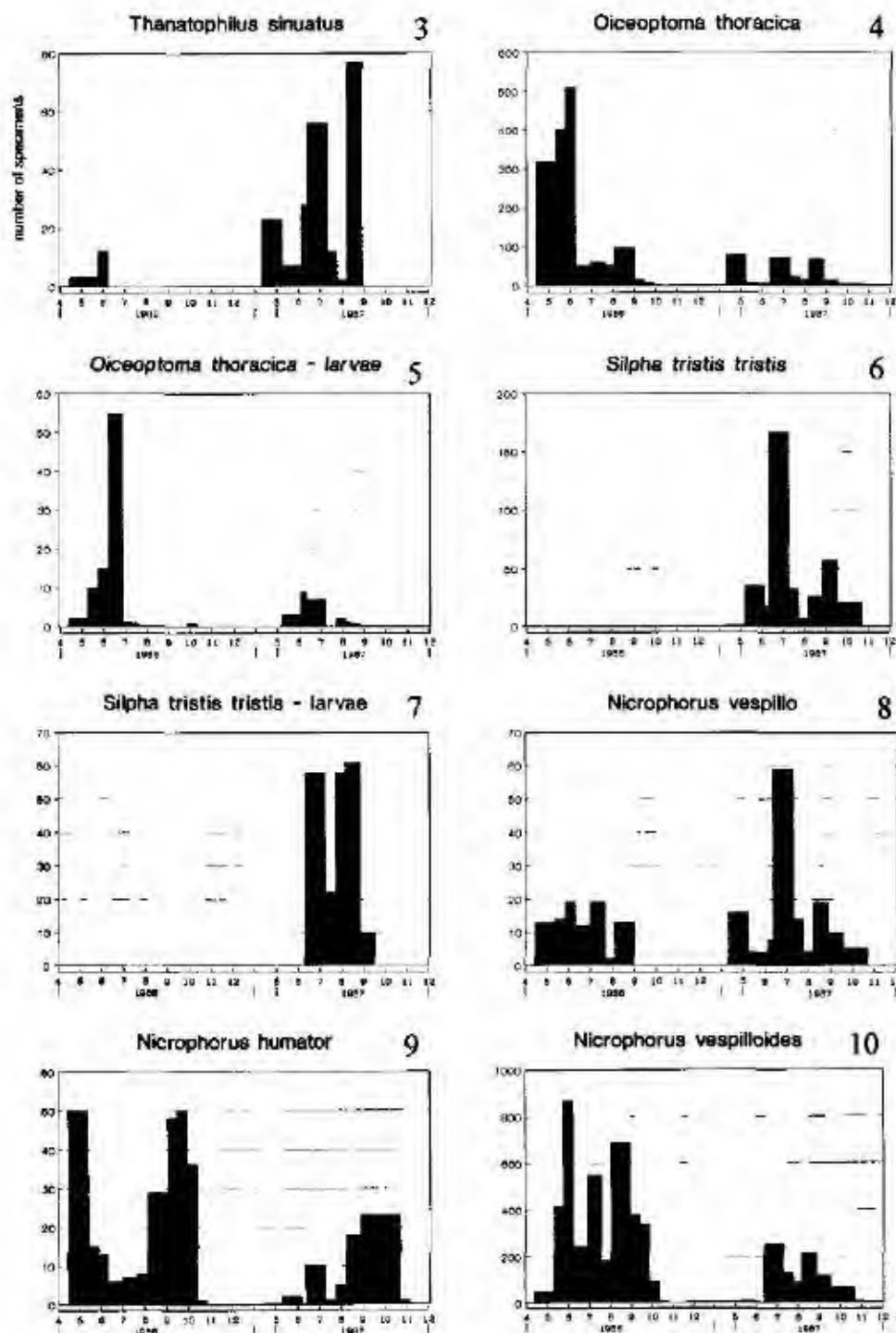
*Nicrophorus vespillo* and *N. humator* were trapped from April to October, with peak activity in July (Fig. 8), and April to May and August to October (Fig. 9), respectively. *N. vespilloides* was captured from April to December, with a weak peak from May to mid-October (Fig. 10). *N. investigator* and *N. fossor fossor* overwinter as larvae. The adults appear late in the season, from May to October (Fig. 11), and from June to October (Fig. 12), respectively. The peak catches were attained in July to August.

According to seasonal changes in activity, cholevine beetles can be sorted to four groups:

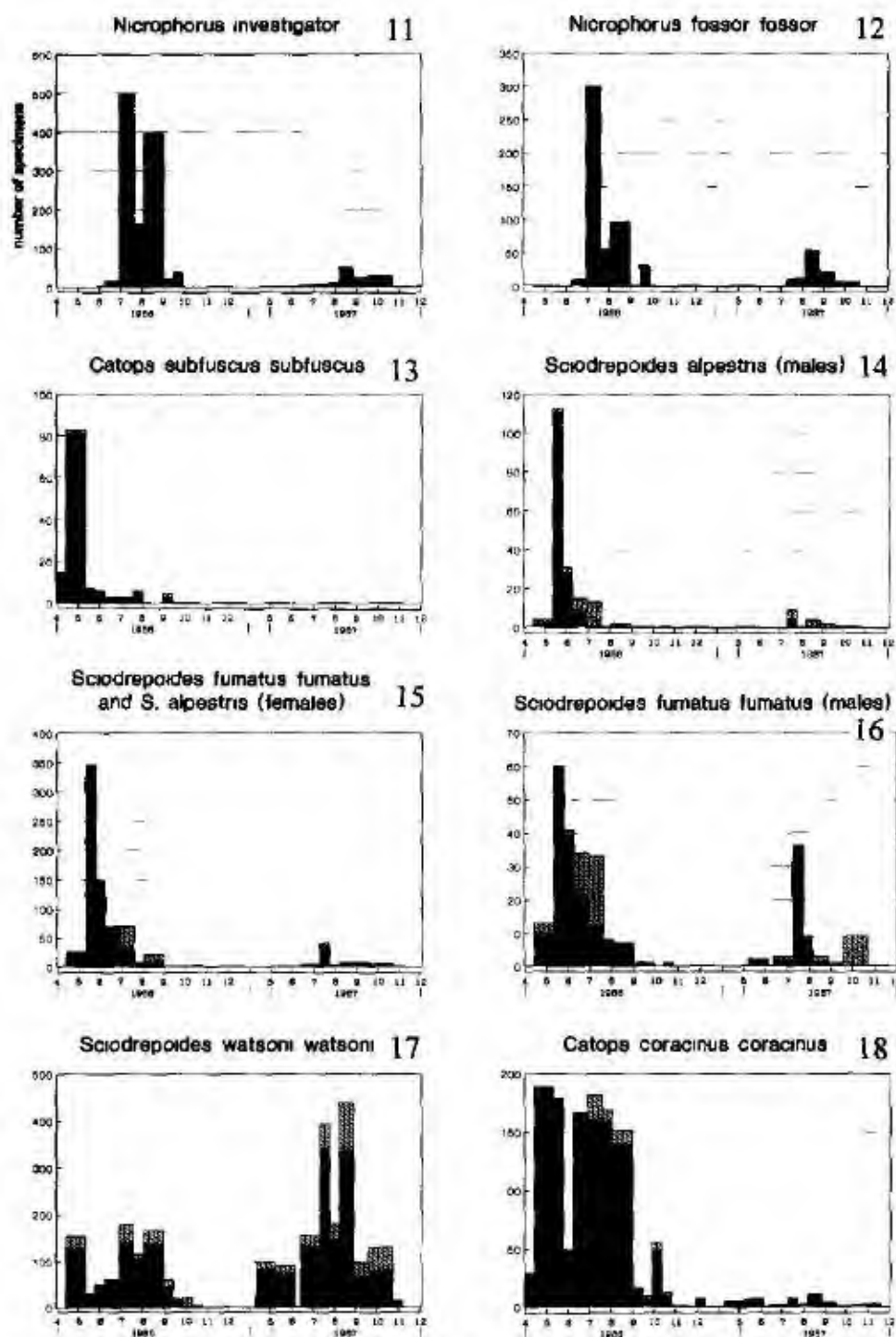
(a) *Catops subfuscus subfuscus* (captured from March to mid-September, peak activity in April, Fig. 13), *Sciodrepoides fumatus fumatus* and *S. alpestris* (both found from April to November, peak activity in May to July, with more teneralis in June, Figs 14-16) have an unimodal activity with a spring peak.

(b) *Sciodrepoides watsoni watsoni* and *Catops coracinus coracinus* have unimodal activity with a summer peak. The former species was captured from April to October, with peak activity in June to August (Fig. 17). High numbers of teneralis were captured in April and in July to October. The latter species was captured from April to December. Its activity was increased from April to August, with teneralis in July-August (Fig. 18).

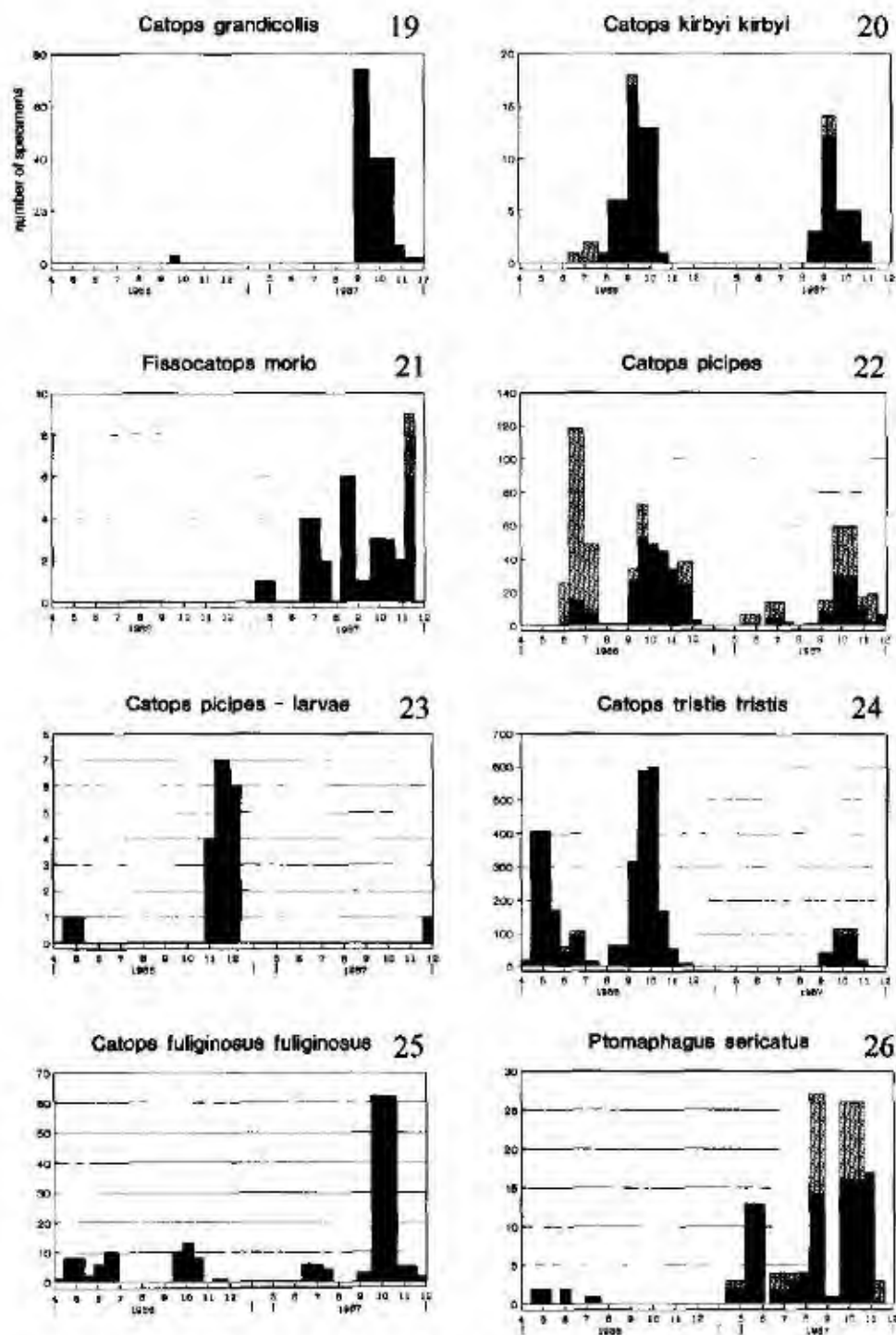
(c) *Catops grandicollis* (captured from September to December, peak abundance in September to October, Fig. 19), *C. kirbyi kirbyi* (captured from June to October, with peak activity in September to mid-October, Fig. 20), and *Fissocatops morio* (captured from April to October,



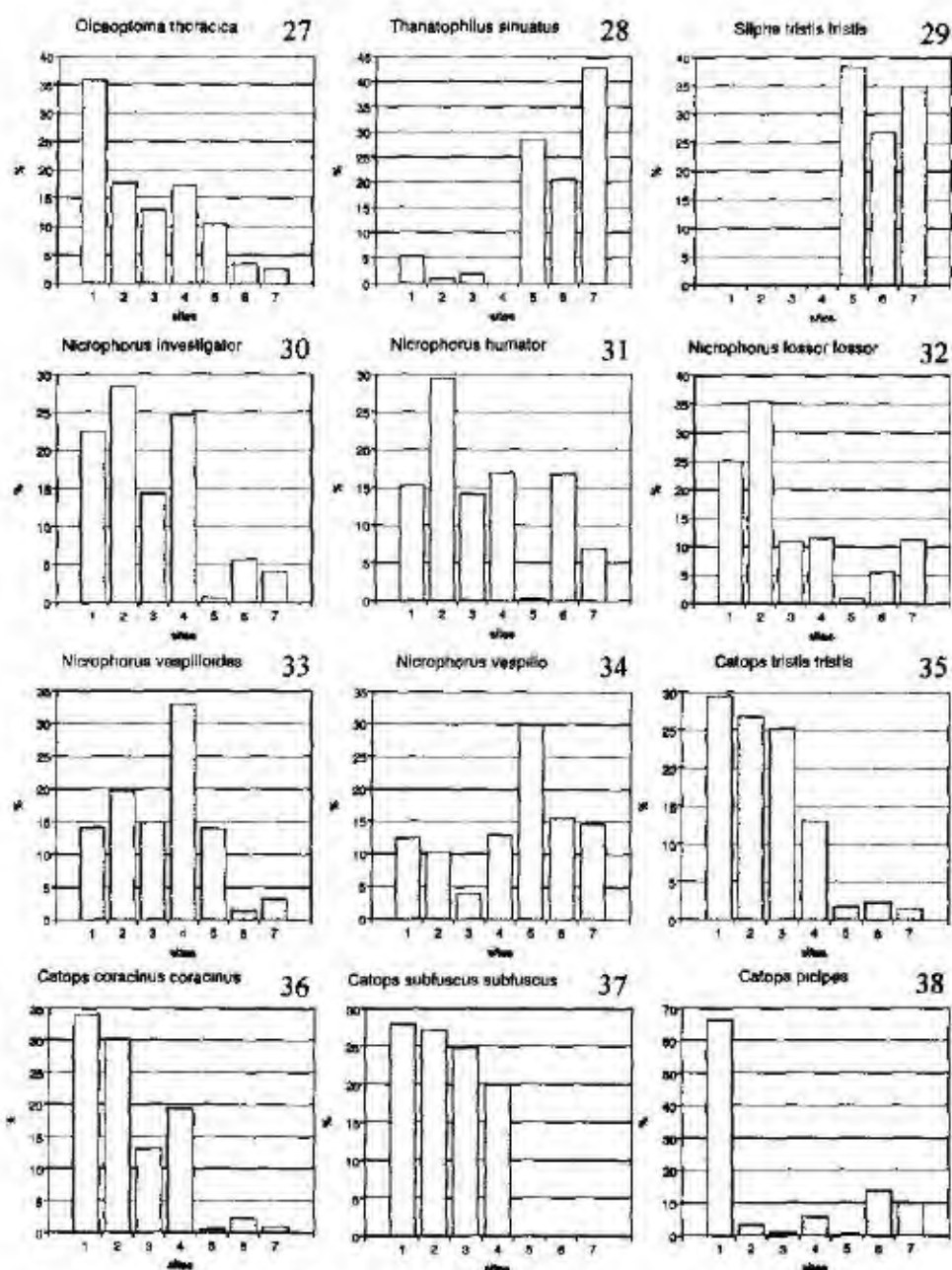
Figs 3-10. Seasonal activities of individual species of Silphidae, trapped in the Velký Blaník Protected Landscape Area (central Bohemia) on forest sites in 1986 and field sites in 1987.



Figs 11-18 Seasonal activities of individual species of Silphidae and Leiodidae -Cholevinae, trapped in the Velký Blaník Protected Landscape Area (central Bohemia) on forest sites in 1986 and field sites in 1987. Black boxes - mature specimens, hatched boxes - teneral specimens.

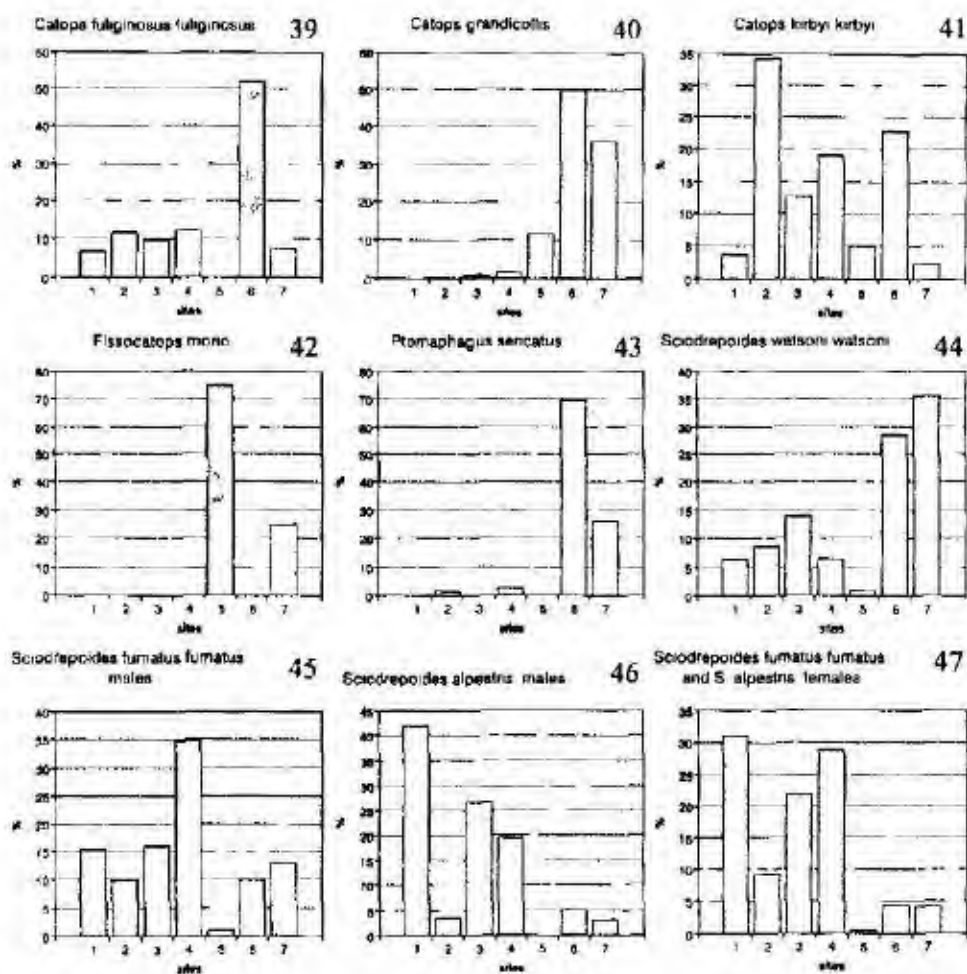


Figs 19-26. Seasonal activities of individual species of Leiodidae, Cholevinae, trapped in the Velký Blaník Protected Landscape Area (central Bohemia) on forest sites in 1986 and field sites in 1987. Black boxes - mature specimens, hatched boxes - teneral specimens.



Figs 27-38. Habitat associations of individual species of Silphidae and Leiodidae: Cholevininae, trapped in the Velký Blánek Protected Landscape Area (central Bohemia) in 1986 and 1987. Sites selected: 1 - top beech stand; 2 - dry coniferous forest; 3 - mixed forest; 4 - moist coniferous forest; 5 - wet marsh; 6 - edge of a maize field; 7 - edge of a barley field. For total numbers of specimens, see Table 1.





Figs 39-47 Habitat associations of individual species of Leiodidae: Cholevinae, trapped in the Velký Blánek Protected Landscape Area (central Bohemia) in 1986 and 1987. Sites selected: 1 - top beech stand, 2 - dry coniferous forest, 3 - mixed forest, 4 - moist coniferous forest, 5 - wet march, 6 - edge of a maize field, 7 - edge of a barley field. For total numbers of specimens, see Table 1.

with presence of tenebrals in October, Fig. 21) have unimodal autumnal activity.

(d) Species with bimodal adult activity. *Catops picipes* was found from mid-May to December, with peaks in June and September to November, and high number of tenebrals in May to June and September to October (Fig. 22). Larvae were captured in November to December and May (Fig. 23). *C. tristis tristis* was collected from March to December, with peak activity in April to May and September to October. Tenebrals appeared in June to October (Fig. 24). *C. fuliginosus fuliginosus* was captured in March to June and September to December, with a weak peak in June and a high peak in October (Fig. 25). *Ptomaphagus sericatus* was captured from April to November, with a weak peak of abundance in June and a high one in August to November. Tenebrals were found in August to November (Fig. 26).

### 3. Habitat associations

Among carrion beetles, *Onceoptoma thoracica* was found at all habitats, but was more abundant in forest (Fig. 27). *Thanatophilus sinuatus* was collected mostly in the field sites (Fig. 28), and *Silpha tristis tristis* was restricted exclusively to the field areas (Fig. 29).

Species of the genus *Nicrophorus* were found in all habitats. All but *N. vespillo* were more common in forest habitats. This is true for *N. investigator* (Fig. 30), *N. humator* was more common in the dry coniferous forest (Fig. 31), *N. fossor fossor* in the beech forest and dry coniferous forest (Fig. 32), and *N. vespilloides* in moist coniferous forest (Fig. 33). *N. vespillo* was more common in field rather than forest habitats, particularly at the moist march (Fig. 34).

Among cholevine beetles, *Catops tristis tristis* and *C. coracinus coracinus* were more common in forest than open habitats (Figs 35,36), and *C. subfuscus subfuscus* was found at forest habitats only (Fig. 37). *C. picipes* was most common in the beech forest (Fig. 38).

*C. fuliginosus fuliginosus* was most abundant near a maize field (Fig. 39). *C. grandicollis* was abundant in the field habitats, particularly near barley field (Fig. 40). *Fissocatops morto* was captured only near a barley field and at moist march (Fig. 42). *Catops kirbyi kirbyi* had no habitat preference (Fig. 41).

*Sciodrepoides watsoni watsoni* was omnipresent, most common being on dry field habitats (Fig. 44). *S. fumatus fumatus* and *S. alpestris* were common in the forest habitats (Figs 45-47); males of the former species were most abundant in the moist coniferous forest (Fig. 45), males of the latter species in the beech forest (Fig. 46), females of these two species were not distinguished. *Ptomaphagus sericatus* was abundant in the dry field habitats, particularly near the edge of maize field (Fig. 43).

Other species were scarce.

### DISCUSSION

Leiodidae: Cholevinae are attracted to various baits. This supports the meaning of Peck & Anderson (1985), that small bodied Cholevinae are generalist scavengers while large Silphidae are restricted to carrion. High preference of carrion beetles for traps baited with meat was also noted by Kamunska (1989).

Both Silphidae and Leiodidae: Cholevinae exhibit different patterns of seasonal activity and/or habitat association. Our data are similar to the results of Novák (1965,1966), Šustek (1982) and Kamunura et al. (1964) in Silphidae, and Topp & Engler (1980), Engler (1980), Majer (1980) and Zota (1990) in Leiodidae: Cholevinae. The data for Nearctic species of Cholevinae are different (Peck & Anderson 1985).

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**The zoogeography of gall midges (Diptera: Cecidomyiidae) of the Czech Republic  
II. Review of gall midge species including zoogeographical diagnoses**

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**Zoogeography, faunistics, Diptera, Cecidomyiidae, zoogeographical diagnosis, frequency groups, horizontal and vertical occurrence, distribution, long-term changes, population dynamics, extinct, endangered, vulnerable species, Czech Republic**

**Abstract.** The zoogeographical diagnoses of 498 gall midge species of the Czech Republic are given. Each species is characterized by the number of localities in which it was ascertained, by number of one of six frequency groups, by character of long-term changes in population density, by altitudinal range and by belt of maximum occurrence, by the designation to one of five groups of vertical occurrence. Species with very low population density are designated as extinct, endangered or vulnerable.

**INTRODUCTION**

Based on the zoogeographical analysis which is presented in the first part of this paper (Skuhrová 1994), I elaborated the zoogeographical diagnoses of all 498 gall midge species forming the gall midge fauna of the Czech Republic. Each zoogeographical diagnosis includes the following items:

1. The horizontal occurrence is given by number of localities (=number of findings) in which the species has been found. This record is divided into two parts: the number of findings which were ascertained during the first half of the 20th century by earlier authors, and the number of findings the second half of 20th century which were gathered during systematic faunistic investigations at 670 localities in the Czech Republic by present author. The horizontal occurrence of 230 gall midge species is shown in maps where data of earlier authors are figured by white circles and data of the present author by black circles.
2. Data about horizontal occurrence make it possible to range each species into one of six frequency groups, viz. I. species occurring solitarily, II. scarcely, III. moderately, IV. considerably, V. abundantly, VI. commonly.
3. The vertical occurrence is given by the name and elevation of the most extreme lying localities which indicate the altitudinal span in which such species occurs. It simultaneously shows the ecological potency of species to live in narrow or in wider altitudinal spans of environmental conditions. The vertical occurrence is shown in graphs accompanying all maps.
4. The maximum occurrence of species in altitudinal spans of 100 meters shows that part of environment in which such species finds the best conditions for its life. Species are named after the altitudinal zone in which they reach maximum occurrence, viz. planare, colline, submountain, mountain and sub-Alpine species. Few species are restricted to the narrow span of one zone, mostly they occur in two, three or four altitudinal zones.
5. Long-term changes in population dynamics, it is possible to range each species in one of six groups of population density, viz. species with increasing, stable, decreasing population density, disappearing and disappeared species, and species insufficiently known (few data about occurrence in the past and at present).

6. Degree of threat according to IUCN categories: species the population density of which decreased conspicuously during the past 50 years, are considered to be threatened and are designated by three categories of the International Union for Conservation of Nature and Natural Resources, which indicate the degree of threat, viz. extinct, endangered and vulnerable species.

In the text the following abbreviations are used:

alt.	altitudinal	Mor.	Moravia
Boh.	Bohemia	Mt.	mountain
di.	district	Mts	Mountains
ea.	eastern	no.	northern
fr.gr.	frequency group	occ.	occurrence, occurring
loc.	locality	so.	southern
max.	maximum	sp.	species
mi.	middle	we.	western

#### Subfamily Lestremiinae

##### *Campylomyza flavipes* (Meigen, 1818)

Biology unknown; larvae probably develop in decaying wood. Vimmer (1905, 1913) caught adults at 5 loc. in alt. range 375 m at Česká Třebová (ea. Boh.) - 1042 m at the Mt. Čerchov in the Český les Mts. (we. Boh.). Fr.gr.I: sp. occ. solitary; colline, submountain and mountain species.

##### *Catocha latipes* Haliday, 1833

Biology unknown. Vimmer (1913) caught adults only at one loc.: at Cheb, 459 m (we. Boh.). Fr.gr. II: sp. occ. solitary; colline species.

##### *Lestremia leucophaea* Meigen, 1818

Biology unknown; adults have been collected at Cheb (we. Boh.), 459 m (Kowarz 1894) and at the Mt. Čerchov, 1042 m in the Český les Mts. (Vimmer 1913). Fr.gr.I: sp. occ. solitary; submountain and mountain species.

##### *Micromya lucorum* Rondani, 1840

Biology unknown; adults have been caught at two localities in we. Boh.: at Františkovy Lázně, di. Cheb, 442 m (Vimmer 1913) and at the Mt. Čerchov, 1042 m in the Český les Mts. Fr.gr.I: sp. occ. solitary; submountain and mountain sp.

##### *Xylopriona uira* (Meigen, 1804)

Syn. *Campylomyza halterata* Zetterstedt, 1852

Biology unknown; adults have been caught at two loc. in we. Boh.: at Cheb, 459 m (Kowarz 1894) and at the Mt. Čerchov, 1042 m (Vimmer 1913). Fr.gr.I: so. occ. solitary; submountain and mountain species.

#### Subfamily Porricondyliinae

##### *Asynapta pectoralis* Winnertz, 1853

Wachtl (1886) reared one male and one female from twigs of *Prunus avium* L. (Rosaceae) attacked primarily by the larvae of *Mygdalis pruni* L. (Curculionidae, Coleoptera) and *Tetrops praeusta* (L.) (Cerambycidae, Coleoptera). Wachtl collected attacked twigs at Znojmo, 290 m (so. Mor.). Fr.gr.I: sp. occ. solitary; colline species.

##### *Asynapta strobi* (Kieffer, 1920)

Larvae develop between the scales in the cones of *Picea abies* (L.) Karsten and other sp. of the family Pinaceae. Skuhrová (1961, 1979) found larvae and reared adults from spruce cones in two loc., Křístek et al. (1976) in 9 localities (from *Larix decidua* Mill.). Fr. gr. I: sp. occ. solitary. Alt. range: 258 m at Adamov near Brno (so. Mor.) - 1000m at Rýchory in the Krkonoše Mts. (ea. Boh.). It is a colline species and penetrates up to the lower part of the mountain zone.

##### *Asynapta thurouti* Rübsaamen, 1893

Larvae live on the stem under the leaf sheaths on *Calamagrostis epigeios* (L.) Roth (Poaceae). Skuhrová et Skuhrový (1960) and Skuhrová (1964-1982) found larvae at 16 loc. Fr.gr.II: sp. occ. scarcely. Alt. range: 210 m at Zbraslav near Praha (mi. Boh.) - 640 m at Benešov, di. Pelhřimov (so. Boh.). It is a colline and submountain species.



*Dicerura iridis* (Kaltenbach, 1874)

Larvae live in groups in the leaf sheaths of *Iris pseudacorus* L. (Iridaceae). Skuhřavá (1981) reported larvae which were collected at one loc., at Podivín, 165 m, di. Břeclav (so Mor.) by R. Rozkošný. Fr. gr. I sp. occ. solitary, planare species.

*Heteropeza pygmaea* Winnertz, 1846

Larvae live under the bark of decaying and rotten old trees and in mushrooms. Vimmer (1913) caught adults at one locality - at Františkovy Lázně, 442 m, di. Cheb (we Boh.). Fr. gr. I sp. occ. solitary. It is a colline species.

*Porricondyla neglecta* Mamaev, 1965

Larvae develop in decaying litter in forests. Skuhřavá (1991) reported about the emergence of adults from 2 loc. in so Mor. - in 1973 at Kunčický, 600 m, near Rajec Jestřebí, di. Blansko, and in 1981 at Lednice, 173 m, di. Břeclav, both data obtained in the framework of the ecological studies (Vaňhara 1983, 1986). Fr. gr. I sp. occ. solitary, colline species. - From the ecological point of view, this sp. may be ranged among the dominant species in insect community of edaphon of a spruce monoculture in the Drahanská vrchovina Upland in the year 1973 (Vaňhara 1992).

*Porricondyla nigripennis* (Meigen, 1830)

Syn. *P. albinus* Meigen, 1830

Biology unknown. Vimmer (1913) caught adults at one loc. - at Nové Strašecí, 470 m, di. Rakovník (nu Boh.). Fr. gr. I sp. occ. solitary. It is a colline species.

*Porricondyla venusta* (Winnertz, 1853)

Larvae develop in rotten wood. Vimmer (1905) reported this species to be found at one locality - at Františkovy Lázně, 442 m, di. Cheb (we Boh.). Fr. gr. I sp. occ. solitary. It is a colline species.

*Winnertzia lugubris* (Winnertz, 1853)

Larvae develop in decaying wood and in mushrooms. Kowarz (1894) listed this species in his Catalogus. He caught adults, probably in the surroundings of Františkovy Lázně, 442 m (we Boh.). Fr. gr. I sp. occ. solitary. It is a colline species. - Note: Auerling (1859) reared adults from fruit trees and determined them as *Aspidiotia lugubris*. It seems to be a misidentification. These adults belong to the species *Aspidiotia prunifera* Rondani.

Subfamily Cecidomyiinae

*Acaroletes tetranchorum* Kieffer, 1913

Larvae feed on mites in flower heads of *Tanacetum vulgare* L. (Asteraceae). Skuhřavá (1959) found larvae only at one loc. - at Krušberk, 404 m (no Mor.). Fr. gr. I sp. occ. solitary. It is a colline species.

*Acodiplosis inulae* (H. Loew, 1847)

Larvae cause globular stem galls on *Inula britannica* L. and *I. ensifolia* L. (Asteraceae). Bayer (1910) and Baudyš (1925, 1926, 1962) found galls in 8, Skuhřavá (1979, 1980, 1981) in 8 loc. Fr. gr. I sp. occ. solitary. Alt. range 187 m at Sedlec near Mikulov (so Mor.) - 435 m at Vráž u Písku (nu Boh.). Max. occ. 200-300 m. It is a planare and colline species. Fig. 11 E.

*Amerhapha gracilis* Rubsamen, 1914

Larvae are inquiline in galls of *Kiefferia pericarpicola* (Bremi). Skuhřavá (1959) found them at one loc. - at Studénka, 239 m (no Mor.). Fr. gr. I sp. occ. solitary. It is a colline species.

*Ametrodiplosis rudimentalis* (Kieffer, 1901)

Larvae induce galls on flower buds of *Artemisia vulgaris* L. (Asteraceae). Skuhřavá (1959, 1980, 1982) found galls at 6 loc. Fr. gr. I sp. occ. solitary. Alt. range 289 m at Břilovec (no, Mor.) - 494 m at Pelhřimov (Boh.-Mor. Uplands). It is a colline species.

*Ametrodiplosis thalictricola* (Rubsamen, 1895)

Larvae induce fruit galls on *Thalictrum flavum* L. (Ranunculaceae). Baudyš (1916, 1954, 1964) found galls at 3, Skuhřavá (1957, 1980) at 2 loc. Fr. gr. I sp. occ. solitary. Alt. range 189 m at Břilany near Kroměříž (so Mor.) - 578 m at Horní Heřmanice (no, Mor.). It is a planare sp. and reaches up to the colline and the submountain zones.

*Anabremia bellevoeyi* (Kieffer, 1896)

Larvae live in rolled and swollen leaflets of *Lathyrus pratensis* L. (Fabaceae). Skuhřavá (1979, 1964, 1981) found galls at 5 loc. Fr. gr. I sp. occ. solitary. Alt. range 275 m at Okoř (nu Boh.) - 351 m at Velké Hraštice (no Mor.). It is a colline species.

\*1 For the figures see Skuhřavá (1994)

***Anabremia medicaginis* Rubsaamen, 1917**

Larvae induce galls on leaflets of *Medicago sativa* L. (Fabaceae) Baudys (1948) found galls at 3 loc. Pouzdran sk. kopce, 200 m, Lisen, 300 m, Hady, 420 m (all in so. Mor.) Fr. gr. I sp. occ. solitary. It is a colline species.

***Anabremia trotteri* (Kieffer, 1909)**

Larvae live in swollen leaflets of *Vicia lutea* L. (Fabaceae) Skuhřavá (1959) found galls at Krušberk, 404 m (no. Mor.) Fr. gr. I sp. occ. solitary. It is a colline species.

***Anabremia victae* Kieffer, 1913**

Larvae induce galls on flower buds of *Vicia sepium* L. (Fabaceae) Baudys (1916, 1924, 1925, 1962, 1965) found galls at 6 loc. Alt. range: 189 m at Blatná near Kromeriz, 383 m at Kamenny kopeč near Brno (both in so. Mor.) Fr. gr. I sp. occ. solitary. It is a colline species.

***Anisostephus betulinum* (Kieffer, 1889)**

Larvae cause a pustule leaf gall on *Betula pubescens* Ehrh. and *B. pendula* Roth (Betulaceae) Bayer (1910, 1914) and Baudys (1916, 1926, 1946, 1948, 1954) found galls in 14. Skuhřavá (1964, 1982) in 45 loc. Fr. gr. III sp. occ. moderately with increasing population density. Alt. range: 228 m at Zdechovice (ea. Boh.) 775 m at Zelnava in the Sumava Mts. Max. occ. 500–700 m. It is a submountain species which occurs only rarely in the colline zone (Fig. 38 D).

***Antichiridium striatum* (Rubsaamen, 1911)**

Larvae develop under the leaf sheaths of *Carex* sp. (Cyperaceae) Vimmer (1937) found larvae at Hodkovice nad Mohelkou, 367 m (no. Boh.) R. Rozkosny on *Glyceria aquatica* (L.) Wahlb. at Vranovice, 177 m (so. Mor.) (Skuhřavá, 1981) Fr. gr. I sp. occ. solitary. It is a colline species.

***Aphidoletes abietis* (Kieffer, 1896)**

Larvae are predators of the aphid *Adelges* (*Sacchiphantes*) *abietis* L. on *Picea abies* (L.) Karsten (= *P. excelsa* Lam.) Skuhřavá (1979) found larvae in 4 loc. Fr. gr. I sp. occ. solitary. Alt. range: 213 m at Stržovice near Melník, 422 m at Sedlec-Prčice (m. Boh.) It is a colline species.

***Aphidoletes aphidimyza* (Rondani, 1847)**

Larvae are predators of many species of aphids on various host plants, they are used for biological control of aphids. Skuhřavá (1972, 1979, 1980) found larvae at 6 loc. lying from 260 m at Praha (m. Boh.) 890 m at Hořava Stráž in the Sumava Mts. Fr. gr. I sp. occ. solitary. It is a polyzonal species without special relation to one of the altitudinal zones.

***Aphidoletes thompsoni* Molin, 1954**

Larvae are predators of the aphid *Dreyfusia piceae* (Ratz.) (= *Adelges piceae* Ratz.) on the bark of *Abies alba* Mill. (Pinaceae). Larvae were found on June 15, 1960 in the forest in Praha-Křc, 260 m (m. Boh.) (unpublished) Fr. gr. I sp. occ. solitary. It is a polyzonal species.

***Aphidoletes urticae* (Kieffer, 1895)**

Larvae feed mainly on *Aphis urticae* Gmelin on *Urtica dioica* L. (Urticaceae). They were found on June 30, 1960 in Praha-Křc (m. Boh.) (unpublished) Fr. gr. I sp. occ. solitary. It is a polyzonal species.

***Apiomyia bergensiannii* (Wachill, 1882)**

Larvae produce woody plurilocular galls on the twigs of *Pyrus communis* L. (Rosaceae) Baudys (1926, 1966) found galls at two loc. in so. Mor.: at Blatná, 263 m, and Pohorelice, 252 m. Fr. gr. I sp. occ. solitary. It is a colline species.

***Apionyx chenopodii* Stefani-Perez, 1908**

Larvae produce a plurilocular, spindle-like swelling of the stem of *Chenopodium album* L. (Chenopodiaceae) Baudys (1966) found galls at one locality: at Kromeriz, 201 m (so. Mor.) Fr. gr. I sp. occ. solitary. It is a planare species.

***Arnoldiola gemmae* (Rubsaamen, 1891)**

Larvae areinquilines in galls of *Andricus fecundator* (Htg.) (Cynipidae, Hymenoptera) on *Quercus robur* L. and *Q. petraea* (Mattsch.) Liebl. (Fagaceae) Skuhřavá (1959, 1980a,b) found larvae at 7 loc. Fr. gr. I sp. occ. solitary. Alt. range: 262 m at Opocno, 464 m at Teplice nad Metují (both in ea. Boh.) Max. occ. 200–300 m. It is a colline species.

***Arnoldiola tibera* (Kieffer, 1909)**

Larvae produce small, round leaf galls on *Quercus robur* L. and *Q. petraea* (Mattsch.) Liebl. (Fagaceae) Baudys

(1925-1965) found galls in 16, Skuhrová (1964-1981) in 140 loc. Fr. gr. IV sp. occ. considerably, with increasing population density. Alt. range: 175 m at Stani Boleslav (m. Boh.) - 815 m at Zátoň pod Boubínem in the Šumava Mts. Max. occ.: 400-500 m. It is a colline species and reaches up to the submountain zone. Fig. 19 E

*Arnoldiola quercus* (Binné, 1877)

Larvae are inquiline in galls of *Contarinia quercina* (Rohr.) Skuhrová (1964) found larvae at Hluhočky, 280 m (no. Mor.) Fr. gr. I sp. occ. solitary. It is a colline species.

*Arnoldiola sambuci* (Kieffer, 1901)

Larvae are inquiline in galls of *Placochela nigripes* (F. Low). Skuhrová (1980, 1981) found larvae at two localities: at Strážnice, 177 m (so. Mor.) and at Landštejn, 620 m (Boh.-Mor. Uplands). Fr. gr. I sp. occ. solitary. It is a polyzonal species.

*Arthrocnodax coryligallarum* (Targioni-Tozzetti, 1886)

Larvae are predators in galls of the mite *Phytomyces avellanae* (Nal.) (Eriophyidae) on *Corylus avellana* L. (Corylaceae). Skuhrová (1979) found larvae at Struhařov, 448 m (m. Boh.) Fr. gr. I sp. occ. solitary. It is a colline species.

*Arthrocnodax peregrina* (Winnertz, 1853)

Larvae are predators in galls of the mite *Eriophyes thomasi* Nal. (Eriophyidae) on *Ligusticum setpyllum* L. (Lamiaceae). Vunmer (1913) mentioned this species in his list of Czechoslovak Diptera. Skuhrová (1959, 1973, 1979, 1980) found larvae at 9 loc. Fr. gr. I sp. occ. solitary. Alt. range: 225 m at Čepetka (ea. Boh.) - 754 m at Železná Ruda in the Šumava Mts. Max. occ.: 400-500 m. It is a colline species.

*Aschistonyx carpnicolus* Rubsaamen, 1917

Larvae live in irregularly curled young leaves of *Carpinus betulus* L. (Corylaceae). Baudyš (1946, 1948, 1960) found galls in 4, Skuhrová (1975-1982) in 42 loc. Fr. gr. III sp. occ. moderately, with increasing population density. Alt. range: 300 m at Nectava - 680 m at Kanč near I-ryšák (both in so. Mor.). Max. occ.: 300-400 m. It is a colline species.

*Asphondylia baudysi* Vunmer, 1937

Larvae cause swellings on pods of *Coronilla varia* L. (Fabaceae). Vunmer (1937) described this species based on a female emerged from galls which were collected by Baudyš at Blansko near Brno. Bayer (1914) and Baudyš (1912-1965) found galls in 40, Skuhrová (1980, 1981, 1982) in 11 loc. At present fr. gr. II, with decreasing population density. Alt. range: 164 m at Zátoň near Poštolma - 475 m at Deblín near Brno (both in so. Mor.). Max. occ.: 200-300 m. It is a planare species and reaches up to colline zone. It is ranked as a vulnerable species. Fig. 10 A

*Asphondylia cyrtus* Frauentfeld, 1873

Larvae produce galls on buds of *Cytisus nigricans* L. and other sp. of this genus (Fabaceae). Bayer (1914), Baudyš (1916-1965), Černík (1931) and Vunmer (1937) found galls in 40, Skuhrová (1957, 1959, 1980) in 6 loc. At present fr. gr. I, with decreasing population density. Alt. range: 176 m at Větelí nad Moravou (so. Mor.) - 500 m at Bohrovník (no. Mor.). Max. occ.: 100-200 m. It is a planare species and reaches up to the colline zone and is ranked as a vulnerable species. Fig. 10 C

*Asphondylia dorycnii* (Müller, 1870)

Larvae cause galls on vegetative tops or in inflorescences of *Dorycnium luteaceum* Scop. (Fabaceae). Skuhrová (1981) found galls at one loc. at Mikulov, 242 m (so. Mor.). Fr. gr. I sp. occ. solitary. It is a planare species. *A. dorycnii* is distributed in so. Europe and reaches the northern boundary of its distribution area in the most so. territory of Moravia.

*Asphondylia echii* (H. Loew, 1850)

Larvae induce galls in flower buds of *Echium vulgare* L. (Boraginaceae). Bayer (1914) and Baudyš (1924, 1925, 1967) found galls in 20, Skuhrová (1975-1982) in 24 loc. Fr. gr. II sp. occ. scarcely. Alt. range: 158 m at Břeclav (so. Mor.) - 430 m at Chlum near Rakovník (m. Boh.). Max. occ.: 100-200 m. It is a planare species and reaches up into the colline zone. It has a stable population density. Fig. 12 D

*Asphondylia ervi* Rubsaamen, 1896

Larvae cause galls on pods of *Vicia sativa* L. and *V. hirsuta* (L.) S.F. Gray (Fabaceae). Baudyš (1917) found galls at 2 loc.: at Dřevohostice, 239 m and at Drásov near Třebíč, 270 m (both in so. Mor.). Fr. gr. I sp. occ. solitary. It is a planare species.

***Asphondylia genistae* H. Loew, 1850**

Syn. *A. moravica* Vimmer, 1928

Larvae produce swellings on the pods of *Genista germanica* L. and *G. tinctoria* L. (Fabaceae). Brehm (1905), Bayer (1910, 1912, 1914), Baudyš (1916-1965) and Vimmer (1928, 1937) found galls in 46, Skuhrová (1957-1982) in 30 loc. Fr. gr. II sp. occ. scarcely, with decreasing population density. Alt. range: 163 m at Nemile near Záhřeb (no. Mor.) - 640 m at Lhotoun near Bezděrov (we. Boh.). Max. occ.: 100-200 m. It is a planare and colline species and reaches up to the submountain zone. Fig. 18 E.

***Asphondylia hornigi* Wachtl, 1880**

Larvae induce galls in unopened flower buds of *Origanum vulgare* L. (Lamiaceae). Vimmer (1913) and Baudyš (1917) found galls at 3, Skuhrová (1980) at 1 loc. Fr. gr. I sp. occ. solitarily. Alt. range: 258 m at Slavhostice (ea. Boh.) - 455 m at Záhřeb near Horkovice nad Mohelkou (no. Boh.). It is a colline species.

***Asphondylia lathyri* Ruhsaamen, 1914**

Larvae produce swellings of the pods of *Lathyrus pratensis* L. (Fabaceae). Skuhrová (1959, 1979, 1980) found galls at 8 loc. Fr. gr. I sp. occ. solitarily. Alt. range: 229 m at Převýšov (ea. Boh.) - 820 m at Kovářská in the Krušné hory Mts. It is a colline species and reaches up to the submountain and lower part of mountain zones. Fig. 43 B.

***Asphondylia lupulinae* Kieffer, 1909**

Larvae induce galls on axillary or terminal buds of *Medicago lupulina* L. (Fabaceae). Baudyš (1946) found galls at Velichovky, 302 m (ea. Boh.), Skuhrová (1979, 1980) at Zbraslav, 210 m (m. Boh.) and Josefov, 272 m (ea. Boh.). Fr. gr. I sp. occ. solitarily. It is a colline species.

***Asphondylia melanopus* Kieffer, 1890**

Larvae cause swellings on the pods of *Lotus corniculatus* L. (Fabaceae). Baudyš (1916-1965) found galls in 30, Skuhrová (1957-1982) in 30 localities. Fr. gr. II sp. occ. scarcely. Alt. range: 158 m at Břeclav (so. Mor.) - 593 m at Bítovanky (Boh.-Mor. Uplands). Max. occ.: 100-300 m. It is a planare species and reaches up to the colline and lower part of submountain zones. It has a stable population density. Fig. 23 A.

***Asphondylia menthae* Kieffer, 1901**

Syn. *A. ignota* Ruhsaamen, 1916

Larvae induce galls in unopened flower buds of *Mentha arvensis* L. and other sp. of this genus (Lamiaceae). Baudyš (1917-1965) and Vimmer (1913) found galls in 23, Skuhrová (1975-1982) in 20 loc. Fr. gr. II sp. occ. scarcely, with decreasing population density. Alt. range: 158 m at Břeclav - 582 m at Třeštice (Boh.-Mor. Uplands). Max. occ.: 100-300 m. It is a planare species and reaches up to the colline and to the lower part of the submountain zones. Fig. 23 B.

***Asphondylia miki* Wachtl, 1880**

Larvae cause galls on pods of *Medicago sativa* L. and *M. falcata* L. (Fabaceae). Bayer (1912), Baudyš (1916-1965) and Černík (1931) found galls in 40, Skuhrová (1957-1982) in 17 localities. At present it occurs scarcely (fr. gr. II), in the past it was more abundant (fr. gr. III). It has a decreasing population density. Alt. range: 136 m at Litoměřice (no. Boh.) - 493 m at Kamenný Újezd (so. Boh.). Max. occ.: 100-300 m. It is a planare species and reaches up to the colline zone. Fig. 10 D.

***Asphondylia ononidis* F. Löw, 1873**

Larvae form bud or pod galls on *Ononis spinosa* L. (Fabaceae). Bayer (1912, 1914), Baudyš (1916-1965) and Vimmer (1937) found galls in 52, Skuhrová (1975-1982) in 17 loc. At present it occurs scarcely (fr. gr. III), in the past it was more abundant (fr. gr. III). It has a decreasing population density. Alt. range: 136 m at Litoměřice - 456 m at Říp (both in no. Boh.). Max. occ.: 100-300 m. It is a planare species and is ranked as a vulnerable species. Fig. 10 B.

***Asphondylia pruniperda* Rondani, 1867**

Syn. *A. prunorum* Wachtl, 1888

Larvae cause bud galls on *Prunus spinosa* L. (Rosaceae). Baudyš (1917-1965) found galls in 18, Skuhrová (1959-1982) in 68 loc. In the past it was less abundant (fr. gr. II), at present it occurs moderately (fr. gr. III) and seems to have an increasing population density. Alt. range: 136 m at Litoměřice (no. Boh.) - 784 m at Slavkovský Chlumek (so. Boh.). Max. occ.: 200-300 m. It is a colline species and reaches up to the submountain zone. Fig. 20 D.

***Asphondylia sarothamni* H. Loew, 1850**

Larvae cause bud or pod galls on *Sarothamnus scoparius* (L.) Wimm. (Fabaceae). Kowarz (1894), Baudyš (1916, 1926, 1965) and Vimmer (1937) found galls in 9, Skuhrová (1964-1982) in 17 loc. At present it occurs scarcely.

(fr. gr. II) and has an increasing population density. Alt. range: 228 m at Zdechovice (no. Boh.) - 620 m at Landštejn (Boh.-Mor. Uplands). Max. occ.: 400-500 m. It is a colline species. Fig. 30.C.

***Asphondylia scrophulariae* Schiner, 1856**

Larvae live in swollen flower buds of *Scrophularia nodosa* L. (Scrophulariaceae). Baudyš (1949) mentioned only one loc.: Věsovice near Kyjov, 281 m (so. Mor.). It is a colline sp. and occurs solitarily (fr. gr. I).

***Asphondylia serpylli* Kieffer, 1898**

Syn. *A. thymi* Kieffer, 1898

Larvae cause flower bud galls on *Thymus serpyllum* L. (Lamiaceae). Baudyš (1917-1964) found galls in 5, Skuhrové (1979) in one loc. Fr. gr. I: sp. occ. solitarily. Alt. range: 236 m at Břilovice nad Svitavou (so. Mor.) - 510 m at Kadov near Blatná (so. Boh.). Max. occ.: 200-300 m. It is a colline species.

***Asphondylia verbasci* (Vallot, 1827)**

Larvae cause flower bud galls on *Verbascum lychnitis* L. and *V. nigrum* L. (Scrophulariaceae). Baudyš (1914-1926) and Vimmer (1937) found galls in 12, Skuhrová (1979, 1980, 1981) in 14 loc. Fr. gr. II: sp. occ. scarcely with stable population density. Alt. range: 198 m at Starovice near Hustopeče (so. Mor.) - 510 m at Oslavička (Boh.-Mor. Uplands). Max. occ.: 200-400 m. It is a colline species. Fig. 22.B.

***Atrichosema aceris* Kieffer, 1904**

Larvae produce swellings on petioles of *Acer campestre* L. (Aceraceae). Baudyš (1962) found galls only at one loc.: Žádlovice near Loštice, 275 m (no. Mor.). It is a colline species (fr. gr. I).

***Bayeriola erysimi* Rübhausen, 1914**

Larvae cause stem swellings on *Erysimum virgatum* Roth (Brassicaceae). Bayer (1914, 1946), Baudyš (1912-1963) and Čermák (1935) found galls in 33 loc. In the years 1914-1963 it occurred moderately (fr. gr. III), since 1963 no galls have been found. It is a disappeared and extinct species. Alt. range: 169 m at Brundys nad Labem (m. Boh.) - 709 m at Kárlov pod Pradědem in the Hrubý Jeseník Mts. Max. occ.: 200-300 m. It is a colline sp. reaching up to the submountain zone. Fig. 25.A.

***Bayeriola salicariae* (Kieffer, 1888)**

Larvae induce leaf or flower bud galls on *Lythrum salicaria* L. (Lythraceae). Baudyš (1947, 1954) found galls in 6, Skuhrová (1972-1981) in 7 loc. Fr. gr. I: sp. occ. solitarily. Alt. range: 158 m at Břeclav (so. Mor.) - 578 m at Horní Heřmanice (no. Mor.). Max. occ.: 100-200 m. It is a planare and colline species. Fig. 23.C.

***Bayeriola thymicola* (Kieffer, 1888)**

Larvae produce terminal or axillary rosette galls on *Thymus serpyllum* L. (Lamiaceae). Bayer (1910, 1914), Baudyš (1912-1965) and Vimmer (1935) found galls in 14, Skuhrová (1975) in one loc. In the past it occurred scarcely (fr. gr. II), since 1965 no galls have been found. It is disappearing or disappeared and is ranked as a endangered species. Alt. range: 215 m in the valley Sv. Prokop in Praha (m. Boh.) - 383 m on the hill Kůmenný kopec in Brno (so. Mor.). Max. occ.: 200-300 m. It is a colline species. Fig. 8.E.

***Blastodiplosis artemisiae* (Kieffer, 1901)**

Larvae cause flower bud galls on *Artemisia vulgaris* L. (Asteraceae). Baudyš (1947) found galls in one, Skuhrová (1957-1982) in 24 loc. Fr. gr. II: sp. occ. scarcely, with increasing population density. Alt. range: 203 m at Měšice (m. Boh.) - 482 m at Přimělkov (Boh.-Mor. Uplands). Max. occ.: 200-300 m. It is a colline species.

***Brachydiplosis caricum* Rübhausen, 1910**

Larvae live under the leaf sheaths of *Carex* sp. (Cyperaceae). Vimmer (1937) found larvae only at one loc.: Vysoké kolo, 1503 m, in the Krkonoše Mts. It occurs rarely (fr. gr. I) and it is a sub-Alpine species. Fig. 52.A.

***Bremiella onobrychidis* (Bremi, 1847)**

Larvae produce pod-like galls on leaflets of *Onobrychis vicifolia* Scop. ssp. *sativa* Lam. (Fabaceae). Bayer (1912, 1914) and Baudyš (1916-1965) found galls in 32 loc. At that time it occurred scarcely (fr. gr. II); since 1965 no galls have been found. It is a disappeared and extinct species. Alt. range: 183 m at Čejč near Hodonín - 433 m at Ketkovice near Brno (both in so. Mor.). Max. occ.: 100-300 m. It is a planare and colline species. Fig. 10.B.

***Buhriella rubicola* Stelter, 1960**

Larvae produce pustule leaf galls on *Rubus idaeus* L. (Rosaceae). Skuhrová (1971-1982) found galls in 13 loc. Fr. gr. II: sp. occ. scarcely. Alt. range: 243 m at Petrovice near Hradec Králové (ea. Boh.) - 688 m at Krásno near Velký Slavkov (no. Boh.). Max. occ.: 200-300 m. It is a colline species and it occurs also in the submountain zone.



*Camptoneuromyia petioii* H. Mamaeva, 1964

Larvae are inquiline in galls of *Contarinia petioii* (Kieffer) on *Populus tremula* L. (Salicaceae). Skuhryva (unpublished) reared three males on 22.7.1958 from larvae found at Skochovice near Nový Bydžov, 242 m (en. Boh.). Fr. gr. I sp. occ. solitary. It is a colline species.

*Cecidomyia pini* (De Geer, 1776)

Larvae are associated with resin on branches of *Pinus sylvestris* L. and *Pinus abies* (L.) Karsten (Pinaceae). Křehov (1856) found larvae at Kaplice. Kowarz (1894) mentioned this sp. in his Catalogue. Skuhryva (1979) found larvae in two loc. Fr. gr. I sp. occ. solitary. Alt. range: 232 m in the valley Kokornický Důl near Mělník (en. Boh.). 537 m at Kaplice (so. Boh.). It is a colline species.

*Chinodiplosis botularia* (Winnertz, 1853)

Larvae are inquiline in galls of *Dasineura fraxini* (Kieffer). Skuhryva (1964, 1982) found larvae in 22 loc. Fr. gr. II sp. occ. scarcely. Alt. range: 162 m at Neratovice (en. Boh.). 700 m at Lapa near Morkův in the Krušné hory Mts. Max. occ.: 100-300 m. It is a colline and submountain species.

*Chinodiplosis cilicrus* (Kieffer, 1889)

Larvae are phytosaprophagous and live mainly in flower heads of various plant species of the family Asteraceae. Skuhryva (1957, 1982) found larvae in 60 loc. Fr. gr. III sp. occ. moderately. Alt. range: 220 m at Svinov (no. Mor.). 820 m at Kovárská in the Krušné hory Mts. Max. occ.: 300-400 m. It is a colline and submountain species.

*Chinodiplosis cirsii* Kieffer, 1909

Larvae develop in spindle-like swellings on the leaf of *Cirsium arvense* (L.) Scop. (Asteraceae). Baudyš (1916, 1954) and Vimmer (1925) found galls in 13 loc. Fr. gr. II sp. occ. scarcely. Alt. range: 214 m at Kralice na Hané. 365 m at Náměstí nad Oslovou (both in so. Mor.). Max. occ.: 200-300 m. It is a colline species.

*Contarinia acerificans* (Kieffer, 1889)

Larvae cause leaf fold galls on *Acer pseudoplatanus* L. and *A. campestre* L. (Asteraceae). Baudyš (1920-1954) and Černík (1937) found galls in 5, Skuhryva (1980) in one loc. Fr. gr. I sp. occ. solitary. Alt. range: 218 m at Olomouc (no. Mor.). 430 m at Čeladná (no. Mor.). Max. occ.: 200-300 m. It is a colline species.

*Contarinia acetosellae* (Ruhsaamen, 1891)

Larvae live in swollen flower buds of *Rumex acetosella* L. (Polygonaceae). Baudyš (1924, 1925) and Vimmer (1937) found galls in 4, Skuhryva (1964, 1977, 1980) in 4 loc. Fr. gr. I sp. occ. solitary. Alt. range: 216 m at Brno. 547 m at Bruntál in the Hrubý Jeseník Mts. Max. occ.: 200-300 m. It is a colline species.

*Contarinia aconitifloris* Steller, 1962

Larvae develop in swollen flower buds of *Aconitum lycoctonum* L. and *A. napellus* (Ranunculaceae). Baudyš (1923, 1954) found galls in 2 loc. at Kotelní páný on the hill side of Kotel, 1435 m in the Krkonoše Mts. and at Jelení zeleh near Křílov pod Prácheňem, 709 m in the Hrubý Jeseník Mts. Fr. gr. I sp. occ. solitary. It is a mountain and sub-Alpine species. Fig. 52 B.

*Contarinia aequalis* Kieffer, 1898

Larvae produce bud galls on *Senecio nemorosus* L. ssp. *Fuchsii* Gmel. (Asteraceae). Baudyš (1912, 1968), Černík (1939) and Seidel (1957) found galls in 70. Skuhryva (1957, 1982) in 160 loc. In the past it was less abundant (fr. gr. III), at present it is abundant (fr. gr. V) and with increasing population density. Alt. range: 215 m at Hl. (no. Mor.). 1120 m at Boudhoj in the Šumava Mts. Max. occ.: 600-700 m. It is a submountain and mountain sp. Fig. 47 A.

*Contarinia anthobia* (F. Low, 1877)

Larvae live in swollen flower buds of *Crataegus oxyacantha* L. (Rosaceae). Baudyš (1923, 1948) and Vimmer (1937) found galls in 6 loc. Fr. gr. I sp. occ. solitary. Alt. range: 176 m at Kralupy nad Vltavou (en. Boh.). 342 m at Všechn (no. ca. Mor.). Max. occ.: 200-300 m. It is a colline species.

*Contarinia anthophthora* (F. Low, 1880)

Larvae live in swollen flower buds of *Verbascum nigrum* L. and *V. austriacum* Schott. (Scrophulariaceae). Baudyš (1926, 1948) found galls in 2. Skuhryva (1979, 1981) in 3 loc. Fr. gr. I sp. occ. solitary. Alt. range: 183 m at Čep near Hodonín (so. Mor.). 406 m at Bechyně (so. Boh.). It is a colline species.

*Contarinia arrhenatheri* Kieffer, 1901

Larvae live in the inflorescences of *Arrhenatherum elatius* (L.) Presl (Poaceae). Skuhryva (1964, 1979) found larvae in 2 loc. at Vinor, 247 m (en. Boh.) and Detřichov, 486 m (no. Mor.). Fr. gr. I sp. occ. solitary. It is a colline species.



- Contarinia artemisiae* Rubsamen, 1917  
Larvae live in slightly swollen flower buds of *Artemisia vulgaris* L. (Asteraceae). Skuhraiva (1974, 1979, 1980) found galls in 4 loc. fr. gr. I sp. occ. solitary. Alt. range: 225 m at Čepce (no. Boh.) - 450 m at Suchbát nad Lázem (so. Boh.). It is a colline species.
- Contarinia asclepiadis* (Giraud, 1863)  
Larvae live in deformed seed of *Cynanchum scutellarium* (L.) Pers. (Asclepiadaceae). Baudys (1960) found it at one loc. - Kotelce hill near Strančák, 529 m (no. Mor.). fr. gr. I sp. occ. solitary. It is a colline species.
- Contarinia baeri* (Prell, 1931)  
Larvae live free between a pair of needles of *Pinus sylvestris* L. (Pinaceae). Skuhraiva (1971-1981) found damaged needles in 20 loc. fr. gr. II sp. occ. scarcely with increasing population density. Alt. range: 227 m at Dolní Počernice near Praha (no. Boh.) - 881 m at Lipka near Vimperk in the Šumava Mts. Max. occ.: 400-600 m. It is a colline species and reaches up to the submountain zone. Fig. 32 L.
- Contarinia ballotae* Kieffer, 1898  
Larvae develop in swollen leaf buds on *Ballota nigra* L. (Lamiaceae). Baudys (1917-1960) found galls in 5 loc. fr. gr. I sp. occ. solitary. Alt. range: 206 m at Brno Husovice (so. Mor.) - 475 m at Píbrň (Boh. Mor. Uplands). Max. occ.: 200-300 m. It is a colline species.
- Contarinia bartschii* (Kieffer, 1890)  
Larvae develop in leaf bud galls on *Lotus corniculatus* L. (Fabaceae). Baudys (1912-1965) and Vimmer (1925, 1937) found galls in 20. Skuhraiva (1959-1982) in 114 loc. In the past fr. gr. II (scarcely), at present fr. gr. IV (considerable occ.), sp. with increasing population density. Alt. range: 158 m at Bruckov (so. Mor.) - 800 m at Hojna Voda near Nové Hrádky (so. Boh.). Max. occ.: 300-400 m. It is a colline and submountain species. Fig. 27 B.
- Contarinia brizae* Kieffer, 1896  
Larvae develop in inflorescences of *Briza media* L. (Poaceae). Skuhraiva (1964-1982) found larvae in 12 loc. fr. gr. II sp. occ. scarcely. Alt. range: 230 m at Detřichov near Olomouc (no. Mor.) - 1025 m at Boží Dar in the Královéhradecký Mts. Max. occ.: 400-600 m. It is a colline and submountain species and penetrates into the lower part of the mountain zone.
- Contarinia campanulae* (Kieffer, 1895)  
Larvae live in deformed flower buds of *Campanula trachelium* L. and *C. medium* L. (Campanulaceae). Baudys (1916-1962) and Černík (1931) found galls in 6. Skuhraiva (1964-1972, 1981) in 5 loc. fr. gr. I sp. occ. solitary. Alt. range: 210 m at Nýčava near Biskupice (so. Mor.) - 531 m at Zátou near Větrná (so. Boh.). Max. occ.: 200-300 m. It is a colline species.
- Contarinia carpini* Kieffer, 1897  
Larvae produce leaf galls on *Carpinus betulus* L. (Corylaceae). Baudys (1916, 1923) found galls in 2. Skuhraiva (1975-1981) in 48 loc. In the past fr. gr. I (solitary), at present fr. gr. III sp. occ. moderately with increasing population density. Alt. range: 184 m at Milotice near Hodonín (so. Mor.) - 534 m at Bezděkov near Zlín nad Sázavou (Boh. Mor. Uplands). Max. occ.: 300-400 m. It is a colline species. Fig. 17 D.
- Contarinia chrysanthemi* (Kieffer, 1895)  
Larvae live in the flower heads of *Chrysanthemum leucanthemum* L. (Asteraceae). Skuhraiva (1964-1979-1980) found larvae in 7 loc. fr. gr. I sp. occ. solitary. Alt. range: 230 m at Detřichov near Olomouc - 577 m at Roudná near Bruntál (both in no. Mor.). Max. occ.: 500-600 m. It is a colline and submountain species.
- Contarinia coryli* (Kaltenbach, 1859)  
Syn. *C. corylina* L. Low, 1878  
Larvae live in swollen catkins of *Corylus avellana* L. (Corylaceae). Bayer (1914), Baudys (1916-1925, 1954) found galls in 19, Skuhraiva (1979-1980-1981) and Skuhraiva & Skuhraiva (1960) in 6 loc. In the past fr. gr. II, at present fr. gr. I sp. occ. solitary, with decreasing population density. Alt. range: 167 m at Hodonín (so. Mor.) - 578 m at Horní Hranice (no. Mor.). Max. occ.: 100-200 m. It is a pluvial and colline species and may be ranked as a vulnerable species. Fig. 32 B.
- Contarinia colini* Kieffer, 1901  
Larvae live in deformed flower buds of *Cotinus corymbosa* Scop. (Anacardiaceae). Galls were found only at the beginning of the 20th century at two loc.: at Hluboká nad Vltavou, 390 m (so. Boh.) (Bayer, 1910), and at Třebíč, 173 m (so. Mor.) (Bayer, 1914). Since that time no galls have been found. It is a disjunct and extinct species.

*Contarinia cracca* Kieffer, 1897

Larvae develop in swollen flower buds of *Vicia cracca* L. (Fabaceae) Bayer (1914, 1946), Baudyš (1912-1968) and Černík (1940) found galls in 70, Skuhrová (1957-1982) in 122 loc. In the past it was sp. occ. moderately (fr. gr. III), at present it is sp. occ. considerably (fr. gr. IV), with increasing population density. Alt. range 210 m at Nectava near Biskupice (so. Mor.) - 1070 m at Horská Kvilda in the Šumava Mts. Max. occ. 400-600 and 800-900/m. It is a submountain and mountain species, it occurs also in the colline zone. Fig. 45 B

*Contarinia crispans* Kieffer, 1909

Larvae live in crumpled leaves of *Valeriana officinalis* L. (Valerianaceae) Baudyš (1920-21, 1954) found galls twice at the same loc. in the valley Česnekový důl, 1200 m, under Mt. Prácheň in the Hrubý Jeseník Mts. It is a sub-Alpine species. Fig. 52 A

*Contarinia cybelae* Gagné, 1972

Syn. *C. coryli* Kieffer, 1909

Larvae live in leaf folds of *Corylus avellana* L. (Corylaceae) Brehm (1905) and Baudyš (1923) found galls in 3, Skuhrová & Skuhrový (1993) in one loc. Fr. gr. I sp. occ. solitary. Alt. range 345 m at Karlštejn (mr. Boh.) - 427 m at Loket near Sokolov (we. Boh.). It is a colline species.

*Contarinia dactylidis* (H. Loew, 1850)

Larvae live in inflorescences of *Dactylis glomerata* L. (Poaceae) Skuhrová (1964) found larvae at Děthchov near Olomouc, 230 m (no. Mor.) Fr. gr. I sp. occ. solitary. It is a colline species.

*Contarinia echii* (Kieffer, 1895)

Larvae live in swollen flower buds of *Echium vulgare* L. (Boraginaceae) Baudyš (1948) found galls in 3 loc. Brno Husovice, 206 m, Mokří hora in Brno, 250 m, Chudějov near Veveržská Býlska, 247 m (all in so. Mor.) Fr. gr. I sp. occ. solitary. It is a colline species.

*Contarinia fagi* Rubsaamen, 1921

Larvae live in bud galls and among young deformed leaves of *Fagus sylvatica* L. (Fagaceae) Baudyš (1954) found galls in one, Skuhrová (1964-1982) in 58 loc. Fr. gr. III sp. occ. moderately with increasing population density. Alt. range 219 m at Velehrad (so. Mor.) - 1120 m at the peak part of the Mt. Boubin in the Šumava Mts. Max. occ. 800-1200/m. It is a mountain species and occurs, but in low quantity, in the submountain and also in the colline zones. Fig. 40 C

*Contarinia festucae* Jones, 1940

Larvae live in inflorescences of *Festuca rubra* L. (Poaceae) Skuhrová (1972, 1980) found larvae in 3 loc. Fr. gr. I sp. occ. solitary. Alt. range 545 m at Třešť (so. Mor.) - 687 m at Hlavňovice (so. Boh.). It is a submountain species.

*Contarinia floriperda* Rubsaamen, 1917

Larvae develop in swollen flower buds of *Sorbus aucuparia* L. (Rosaceae) Baudyš (1923, 1947, 1954) and Seidel (1957) found galls in 5, Skuhrová (1961) in 2 loc. Fr. gr. I sp. occ. solitary. Alt. range 260 m at Praha (mr. Boh.) - 1400 m at Pančevka louka above the Labský důl valley in the Krkonoše Mts. It is a mountain and sub-Alpine species. Fig. 52 E

*Contarinia florum* Rubsaamen, 1917

Larvae live in swollen flower buds of *Asparagus officinalis* L. (Liliaceae) Baudyš (1925, 1954, 1963) found galls in 3 loc. Fr. gr. I sp. occ. solitary. Alt. range 200 m at the Pouzdřanské kopce-hills - 216 m at Brno (both in so. Mor.). It is a colline species.

*Contarinia geti* Kieffer, 1909

Syn. *C. geicola* Rubsaamen, 1917

Larvae live in deformed leaves of *Geum banum* L. (Rosaceae) Baudyš (1917-1964) found galls in 15, Skuhrová (1964-1982) in 27 loc. Fr. gr. II sp. occ. scarcely, with increasing population density. Alt. range 177 m at Strážnice (so. Mor.) - 881 m at Lipka near Vimperk in the Šumava Mts. It is a planare and colline species and reaches up to the mountain zone. Fig. 42 B

*Contarinia helianthem* (Hardy, 1850)

Larvae live in terminal leaf bud galls on *Helianthemum nummularium* (L.) Mill. (Cistaceae) Baudyš (1925, 1954) found galls at the loc. Velká kotlina under the Mt. Vysoká hole, 1464 m in the Hrubý Jeseník Mts. Fr. gr. I sp. occ. solitary. It is a sub-Alpine species. Fig. 52 A

*Contarinia heraclei* (Rubsamen, 1889)

Larvae live in depressions on the leaves of *Heracleum sphondylium* L. (Apiaceae). Skuhravá (1979) found galls at the loc. Brezinka near Vidum, 331 m (m. Boh.) Fr. gr. I sp. occ. solitarily. It is a colline species.

*Contarinia hyperici* Barnes, 1952

Larvae develop in swollen flower buds of *Hypericum perforatum* L. (Hypericaceae). Baudyš (1963) found galls only at one loc. at Vysoké nad Jizerou, 692 m (ea. Boh.) Fr. gr. I sp. occ. solitarily. It is a submountain species.

*Contarinia hypochoeridis* (Rubsamen, 1891)

Larvae live in flower heads of *Hypochoeris radicata* L. and *H. glabra* L. (Asteraceae). Baudyš (1954) found damaged flowers only in one loc. Skuhravá (1961-1982) in 71 loc. Fr. gr. III sp. occ. moderately. Alt. range 162 m at Neratovice (m. Boh.) - 1300 m at Zlaté Návrky in the Krkonoše Mts. Max. occ. 200-500 m. It is a colline species and reaches up to the submountain zone. It may develop also in the mountain zone.

*Contarinia inquilina* Rubsamen, 1917

Larvae areinquilines in the galls of *Kiefferia pericarpicola* (Brenn.) on *Pimpinella saxifraga* L. (Apiaceae). Skuhravá (1957-1980) found larvae in 4 loc. Fr. gr. I sp. occ. solitarily. Alt. range 241 m at Hlučín (no. Mor.) - 428 m at Bítov (so. Mor.). It is a colline species.

*Contarinia jaspis* Rubsamen, 1914

Larvae develop in terminal leaf galls on *Lathyrus pratensis* L. (Fabaceae). Skuhravá (1964-1982) found galls in 62 loc. Fr. gr. III sp. occ. moderately. Alt. range 162 m at Neratovice (m. Boh.) - 775 m at Želňava in the Šumava Mts. Max. occ. 300-400 m. It is a colline species and reaches up to the submountain zone.

*Contarinia jacobaeae* (H. Loew, 1850)

Larvae develop in swollen flower heads or in deformed stems of *Senecio jacobaeae* L. and *S. vulgaris* L. (Asteraceae). Baudyš (1916, 1964) found galls in 5, Skuhravá (1957-1982) in 22 loc. Fr. gr. II sp. occ. scarcely, with increasing population density. Alt. range 232 m at Ludgeřovice near Ostrava (no. Mor.) - 640 m at Trhonné (we. Boh.). Max. occ. 400-500 m. It is a colline species and it occurs also in the submountain zone.

*Contarinia lamitcola* Rubsamen, 1915

Larvae develop in leaf bud galls on *Lamium maculatum* L. (Lamiaceae). Baudyš (1917, 1920-21, 1960, 1965) found galls in 7 loc. Fr. gr. I sp. occ. solitarily. Alt. range 200 m at Chuchle, now a part of Praha (m. Boh.) - 529 m at the hill Kotouč near Stramberk (no. Mor.). Max. occ. 200-300 m. It is a colline sp.

*Contarinia lentis* Aczél, 1942

Larvae develop in swollen unopened flower buds of *Lens nigricans* (MB.) Godr. (= *L. esculenta*, *L. culinaris*) (Fabaceae). Baudyš (1947) mentioned galls in 3 loc. Dyjčkovice near Znojmo, 185 m, Brno Převrky, 207 m, Bačkovice nad Brežnou near Třebnov, 256 m (all so. Mor.). Fr. gr. I sp. occ. solitarily. It is a planare species.

*Contarinia lilii* Kieffer, 1909

Larvae live in swollen flower buds of *Lilium martagon* L. (Liliaceae). Baudyš (1963) found galls only at one loc. at Dřevčostice near Přerov, 239 m (no. Mor.). Fr. gr. I sp. occ. solitarily. It is a colline species.

*Contarinia loti* (De Geer, 1776)

Larvae induce galls on flower buds of *Lotus corniculatus* L. (Fabaceae). Brehm (1905), Bayer (1910, 1912, 1914) and Baudyš (1916-1965) found galls in 60, Skuhravá (1957-1982) in 89 loc. Fr. gr. IV sp. occ. considerably, with increasing population density. Alt. range 158 m at Břeclav (so. Mor.) - 1065 m at Javorník in the Šumava Mts. Max. occ. 300-400 m. It is a colline species and it reaches into the submountain zone.

*Contarinia lysimachiae* (Rubsamen, 1893)

Larvae live in swollen flower buds of *Lysimachia vulgaris* L. (Primulaceae). Skuhravá (1959-1982) found galls in 96 loc. Fr. gr. IV sp. occ. considerably. Alt. range 228 m at Zlechovice (ea. Boh.) - 860 m at Maránská in the Krázné hory Mts. Max. occ. 600-700 m. It is a colline and submountain species. Fig. 43 A.

*Contarinia marchali* Kieffer, 1896

Larvae develop inside swollen fruits of *Fraxinus excelsior* L. (Oleaceae). Baudyš (1964) found damaged fruits on the hill-side of the Hostýnské kopce Hills, about 500 m (so. Mor.), Skuhravá (1959) at Teřovice near Svitavice, 483 m (so. Boh.). Fr. gr. I sp. occ. solitarily. It is a colline species.

*Contarinia medicaginis* Kieffer, 1895

Larvae induce galls on flower buds of *Medicago sativa* L. and *M. falcata* L. (Fabaceae). Loss of seed results, it is a serious pest of lucerne. Bayer (1910) and Baudyš (1912-1968) found galls in 120, Skuhravá (1956-1982) in 129 loc. Fr. gr. IV sp. occ. considerably, with stable population density. From time to time outbreaks occur. Alt.

range 136 m at Litoměřice (no. Boh.) 592 m at Větná near Český Krumlov (so. Boh.) Max. occ. 100-300 m. It is a planare and colline species. Fig. 21 B.

*Contarinia melanocera* Kieffer, 1904

Larvae produce plumular swellings of the twigs of *Genista tinctoria* L. (Fabaceae). Bayer (1912, 1914, 1946), Baudys (1923-1965) and Čermík (1927) found galls in 34. Skuhraiva (1957-1982) in 15 loc. In the past it was more abundant (fr. gr. III); at present it occurs scarcely (fr. gr. II). Alt. range 241 m at Brantice near Křivov (no. Mor.) 618 m at Studený in the Boh.-Mor. Uplands. Max. occ. 500-600 m. It is a colline and submountain species with decreasing population density and it is ranked as a vulnerable species. Fig. 30 B.

*Contarinia merceri* Barnes, 1930

Larvae live in the inflorescences of *Alupecurus pratensis* L. (Poaceae). Skuhraiva (1964-1982) found larvae in 26 loc. Fr. gr. II sp. occ. scarcely. Alt. range 225 m at Sumice near Uherské Hradiště (so. Mor.) 1025 m at Boží Dar in the Krusné hory Mts. Max. occ. 400-600 m. It is a colline and submountain species and it penetrates into the mountain zone. Fig. 29 I.

*Contarinia molluginis* (Ruhsaamen, 1889)

Larvae live in terminal galls on *Gallium molluga* L. (Rubiacae). Baudys (1912-1964) and Vunmer (1937) found galls in 23, Skuhraiva (1964-1982) in 32 loc. Fr. gr. II sp. occ. scarcely. Alt. range 136 m at Litoměřice (no. Boh.) 595 m at Křivov near Stokovce (so. Boh.) Max. occ. 300-400 m. It is a planare and colline species. Fig. 16 D.

*Contarinia nasturtii* (Kieffer, 1888)

Larvae induce galls on flower buds of *Nasturtium palustre* DC. (Brassicaceae) and other host plant species of this family, causing several types of damage. It is a serious pest of vegetable crops. Bayer (1914), Baudys (1916-1968) and Vunmer (1937) found galls in 40, Skuhraiva (1959-1982) in 70 loc. At present it is sp. of moderate occ. (fr. gr. III), with increasing population density. Alt. range 162 m at Neratovice (mt. Boh.) 765 m at Lenora in the Sumava Mts. Max. occ. 400-600 m. It is a colline species and it occurs both in the planare and the submountain zones. Fig. 24 C.

*Contarinia nikolayi* (Ruhsaamen, 1895)

Larvae live in swollen flower buds of *Heracleum sphondylium* L. (Apiaceae). Baudys (1917-1964) found galls in 35, Skuhraiva (1957-1982) in 15 loc. Fr. gr. II sp. occ. scarcely, with decreasing population density. Alt. range 215 m at Hlač near Ostrava (no. Mor.) 650 m at Desné in the Orlické hory Mts. (ea. Boh.) Max. occ. 200-300 m. It is a colline species and it reaches up to the submountain zone.

*Contarinia onobrychidis* Kieffer, 1895

Larvae induce galls on flower buds of *Onobrychis viciifolia* Scop. (Fabaceae). Bayer (1910, 1914), Baudys (1916-1965) and Vunmer (1925) found galls in 60, Skuhraiva (1979-1980) in 7 loc. At present it is sp. occ. solitarily (fr. gr. I), in the past it was more abundant (fr. gr. III). Alt. range 215 m at Stechovice (mt. Boh.) 465 m at Moravské Budejovice (so. Mor.) Max. occ. 200-300 m. It is a colline species with decreasing population density and it is ranked as a vulnerable species. Fig. 11 A.

*Contarinia ononidis* Kieffer, 1899

Larvae develop among clustered leaves on the vegetative tip of *Ononis spinosa* L. (Fabaceae). Skuhraiva (1973-1982) found galls in 10 loc. Fr. gr. I sp. occ. solitarily. Alt. range 136 m at Litoměřice (no. Boh.) 387 m at Lomnická near Stržbro (we. Boh.) Max. occ. 400-500 m. It is a colline species.

*Contarinia pastinaceae* (Ruhsaamen, 1891)

Larvae live in slightly swollen fruits of *Pastinaca sativa* L. (Apiaceae). Baudys (1916, 1946, 1948), Vunmer (1937) and Čermík (1940) found galls in 10 loc. Fr. gr. I sp. occ. solitarily. Alt. range 220 m at Olomouc 480 m at Moravská Třebová (no. Mor.) Max. occ. 200-300 m. It is a colline species. Since 1948 it has not been found, it is a disappeared and extinct species.

*Contarinia petioli* (Kieffer, 1898)

Larvae produce globular galls on leaf petioles on *Populus tremula* L. (Salicaceae). Bayer (1910, 1912, 1946), Baudys (1916-1969) and Čermík (1931-1934, 1939) found galls in 110, Skuhraiva (1957-1982) in 156 loc. Fr. gr. IV sp. occ. considerably, with increasing population density. Alt. range 162 m at Neratovice (mt. Boh.) 1000 m at Hrabická Lada in the Sumava Mts. Max. occ. 300-600 m. It is a colline and submountain species and reaches up to the mountain zone. Fig. 37 B.



*Contarinia pilosellae* Kieffer, 1896

Larvae live in swollen flower heads of *Hieracium pilosella* L. (Asteraceae). Baudys (1923-1964) found galls in 10. Skuhrava (1979) in 2 loc. Fr gr I sp occ. solitary. Alt. range: 197 m at Praha Kyje (m. Boh.) - 529 m at Kotout near Stramberk (no. Mor.). Baudys (1954) reported this species from the peak part of the Mt. Králický Sněžník, 1423 m on *Hieracium nigritum* Uechtr. (but it may be another species). Max. occ. 200-300 m. It is a colline species and penetrates up to sub-Alpine zone. Fig. 51 L.

*Contarinia pisi* (Winnertz, 1854)

Larvae live in swollen flower buds, clustered leaves or malformed pods of *Pisum sativum* L. (Fabaceae). Vimmer (1913). Baudys (1948, 1960) found galls in 3. Skuhrava (1957-1982) in 6 loc. Fr gr I sp occ. scarcely. Alt. range: 263 m at Žandov near Česká Lípa (no. Boh.) - 458 m at Chanovice near Blatná (so. Boh.). Max. occ. 500-600 m. It is a colline species.

*Contarinia poae* Barnes, 1946

Larvae live in inflorescences of *Poa pratensis* L. (Poaceae). Skuhrava (1974) found larvae only at one loc. at Štokovce, dt. Strakonice, 414 m (so. Boh.). Fr gr I sp occ. solitary. It is a colline species.

*Contarinia populi* (Ruhssamen, 1917)

Larvae produce small globular galls on the leaves of *Populus tremula* L. (Salicaceae). Bayer (1910, 1914) and Baudys (1916-1967) found galls in 40. Skuhrava (1959-1982) in 168 loc. Fr gr V sp occ. abundantly, with increasing population density. Alt. range: 188 m at Prodnice (m. Boh.) - 1070 m at Planě in the Šumava Mts. Max. occ. 400-500 m. It is a colline species and reaches up to the submountain and mountain zones. Fig. 37 A.

*Contarinia pruniflorum* Coutin et Rambier, 1955

Larvae live in swollen flower buds of *Prunus spinosa* L. and *P. domestica* L. (Rosaceae). Baudys (1923, 1967) found galls in 2. Skuhrava (1979) also in 2 loc. Fr gr I sp occ. solitary. Alt. range: 277 m at Hradec nad Moravou (no. Mor.) - 448 m at Struhárov near Kamenice (m. Boh.). It is a colline species.

*Contarinia pulchripes* (Kieffer, 1890)

Larvae live in deformed pods of *Sarothamnus scoparius* (L.) Wimmer and other host plant species of the family Fabaceae. Vimmer (1937) found larvae at one loc. Skuhrava (1964-1982) in 17 loc. Fr gr II sp occ. scarcely. Alt. range: 230 m at Detřichov (no. Mor.) - 548 m at Chanovice, dt. Klatovy (so. Boh.). Max. occ. 300-500 m. It is a colline species.

*Contarinia pyrivora* (Riley, 1886)

Larvae live inside the unshapely and enlarged fruitlets of *Pyrus communis* L. (Rosaceae). Vimmer (1907-1931), Baudys (1923-1966) and Černík (1932, 1939) found damaged fruits in 30. Skuhrava (1964-1982) in 22 loc. Fr gr II sp occ. scarcely. Alt. range: 177 m at Nelahozeves (m. Boh.) - 726 m at Klepačův near Sumpěrk (no. Mor.). Max. occ. 200-300 m. It is a colline species and reaches up to the submountain zone. Fig. 18 C.

*Contarinia quercicola* (Ruhssamen, 1899)

Larvae develop in leaf bud galls of *Quercus cerris* L. (Fagaceae). Bayer (1914) found galls at Lednice, 173 m. Skuhrava at Valašce, 192 m (both in so. Mor.). Fr gr I sp occ. solitary. It is a planare species.

*Contarinia quercina* (Ruhssamen, 1890)

Larvae live in leaf bud galls of *Quercus robur* L. and *Q. petraea* (Matt.) Liehl. (Fagaceae). Černík (1931) and Baudys (1954) found galls in 2. Skuhrava (1957-1982) in 185 loc. Fr gr V sp occ. abundantly, with increasing population density. Alt. range: 162 m at Neratovice (m. Boh.) - 770 m at peat bog Rejvíz in the Hrubý Jeseník Mts. (no. Mor.). Max. occ. 300-500 m. It is a colline species and reaches up to the submountain zone. Fig. 19 C.

*Contarinia quinquenotata* (F. Low, 1888)

Larvae live in swollen, deformed and unopened flower buds of *Hemerocallis fulva* L. (Liliaceae). Müller (1956) found galls in 2. Skuhrava (1979-1981) in 6 loc. Fr gr I sp occ. solitary. Alt. range: 173 m at Lednice (so. Mor.) - 595 m at Kraselov near Strakonice (so. Boh.). Max. occ. 300-400 m. It is a colline species.

*Contarinia rhamni* (Ruhssamen, 1892)

Larvae live in swollen flower buds of *Frangula alnus* Mill. (Rhamnaceae). Baudys (1954) found galls at one loc. at Bludov near Sumpěrk, 306 m (no. Mor.). Fr gr I sp occ. solitary. It is a colline species.

*Contarinia ribis* Kieffer, 1909

Larvae live in unopened flower buds of *Ribes in a crispa* L. (= *R. grossularia* L.) (Grossulariaceae). Baudys (1921-1923) and Vimmer (1925, 1931) found galls in 7 loc. Fr gr I sp occ. solitary. Alt. range: 230 m in the valley Sv. Prokop in Praha (m. Boh.) - 498 m in the Pustý zeleh valley near Blansko (so. Mor.). Max. occ.

200-400 m. It is a colline species.

***Contarinia rubicola* Kieffer, 1909**

Larvae live in swollen flower buds of *Rubus cuneatus* L. (Rosaceae). Baudyš (1947) found galls only at one loc. at Květnice near Tršnov, 470 m (so. Mor.). Fr. gr. I sp. occ. solitary. It is a colline species.

***Contarinia rumicis* (H. Loew, 1850)**

Larvae live in swollen flower buds of *Rumex acetosella* L. (Polygonaceae). Skuhrová (1975, 1979) found galls in two loc. at Předměříce nad Jizerou, 188 m, and at Kamenné Žehrovice near Kladno, 387 m (both in m. Boh.). Fr. gr. I sp. occ. solitary. It is a colline species.

***Contarinia sambuci* (Kaltenbach, 1873)**

Syn. *C. lonicerae* F. Löw, 1877

Larvae live in swollen flower buds of *Sambucus nigra* L., *S. ebulus* L., *Lonicera xylosteum* L. and *L. nigra* L. (Caprifoliaceae). Bayer (1914) and Baudyš (1920-1968) found galls in 30, Skuhrová (1979-1982) in 12 loc. Fr. gr. II sp. occ. scarcely, with decreasing population density. Alt. range: 220 m at Osoblaha, d. Bruntal - 745 m at Karlova Studánka in the Hrubý Jeseník Mts. (both in no. Mor.). Max. occ. 200-500 m. It is a colline species and penetrates into the submountain zone.

***Contarinia scoparii* (Ruhssamen, 1889)**

Larvae live in stem swellings on *Scrophularia scoparius* (L.) Wurm. (Labaceae). Vimmer (1937) found galls at one loc. at Praha Kreský les, 260 m (m. Boh.). Fr. gr. I sp. occ. solitary. It is a colline species.

***Contarinia scrophulariae* Kieffer, 1896**

Larvae live in swollen flower buds of *Scrophularia nodosa* L. (Scrophulariaceae). Bayer (1914, 1946), Černík (1940) and Baudyš (1954, 1960, 1964) found galls in 6, Skuhrová (1964-1981) in 9 loc. Fr. gr. I sp. occ. solitary. Alt. range: 230 m at Děčichov - 577 m at Roudno (both in no. Mor.). Max. occ. 200-400 m. It is a colline species.

***Contarinia scutellari* Ruhssamen, 1910**

Larvae live in malformed fruits of *Rumex scutellatus* L. (Polygonaceae). Skuhrová (1975) found galls at one loc. at Chlum near Rakovník, 413 m (m. Boh.). Fr. gr. I sp. occ. solitary. It is a colline species.

***Contarinia silvestris* Kieffer, 1897**

Larvae live in slightly swollen pods of *Lathyrus sylvestris* L. (Fabaceae). Baudyš (1925, 1926, 1965) found galls in 6, Skuhrová (1973, 1979) in 4 loc. Fr. gr. I sp. occ. solitary. Alt. range: 193 m at Mušovky near Kroměříž (so. Mor.) - 500 m at Tachov (we. Boh.). Max. occ. 200-300 m. It is a colline species.

***Contarinia solani* (Ruhssamen, 1891)**

Larvae live in swollen flower buds of *Solanum dulcamara* L. (Solanaceae). Baudyš (1924, 1954) found galls in 4, Skuhrová (1957-1982) in 19 loc. Fr. gr. II sp. occ. scarcely, with increasing population density. Alt. range: 173 m at Lednice (so. Mor.) - 415 m at Třebovice, d. Ústí nad Orlicí (ea. Boh.). Max. occ. 200-300 m. It is a colline species. Fig. 9 A.

***Contarinia sorbi* Kieffer, 1896**

Larvae produce pod-like leaf galls on *Sorbus aucuparia* L. (Rosaceae). Baudyš (1948) found galls in one locality, Skuhrová (1971-1981) in 86 loc. Fr. gr. IV sp. occ. considerably, with increasing population density. Alt. range: 225 m at Ceperka near Pardubice (ea. Boh.) - 1065 m at Javorník in the Šumava Mts. Max. occ. 800-1000 m. It is a mountain species and occurs, but in low quantity, in the submountain and the colline zones. Fig. 37 C.

***Contarinia steini* (Karsch, 1881)**

Larvae develop in swollen flower buds of *Melandrium album* (Mill.) Garcke and *M. rubrum* (Weig.) Garcke (Caryophyllaceae). Baudyš (1925-1968) found galls in 26, Skuhrová (1957-1982) in 126 loc. At present fr. gr. IV sp. occ. considerably, in the past fr. gr. II. It seems to be sp. with increasing population density. Alt. range: 158 m at Břeclav (so. Mor.) - 1120 m at the peak part of Boubín in the Šumava Mts. Max. occ. 100-200 m. It is a planare and colline species and reaches up into the submountain and the mountain zones where larvae develop more often on *M. rubrum* than on *M. album*. Fig. 48 B.

***Contarinia subulifex* Kieffer, 1897**

Larvae produce horn-like hent galls on the upper leaf side of *Quercus cerris* L. (Fagaceae). Skuhrová (1981) found galls at one loc. at Lednice, 173 m, in the most so. part of Mor. Fr. gr. I sp. occ. solitary. It is a planare species.

***Contarinia tanacetii* Ruhssamen, 1921**

Larvae live free among the achenes in the flower heads of *Tanacetum vulgare* L. (Asteraceae). Skuhrová (1959-1982) found larvae in 17 loc. Fr. gr. II sp. occ. scarcely. Alt. range: 210 m at Benešov nad Ploučnicí - 568 m at



Dolní Jeřec nad Nisou (both in no. Boh.) It is a colline species

*Contarinia ulmarum* (Kieffer, 1890)

Larvae cause conspicuous swellings of flower stalks, leaf petioles and young twigs on *Tilia cordata* Mill. and *T. platyphylla* Scop. (Tiliaceae). Bayer (1914, 1946), Baudyš (1916-1964) and Čermák (1932, 1933) found galls in 50, Skuhřavá (1959-1982) in 62 loc. Fr. gr. III sp. occ. moderately. Alt. range 177 m at Strážnice (so. Mor.) - 750 m at Jezičko Ukyzu near Zadov in the Sumava Mts. Max. occ. 200-400 m. It is a colline species and reaches up to the submontain zone. Fig. 33 E

*Contarinia tragopogonis* Kieffer, 1909

Larvae live free among the achenes of the faded flower heads of *Tragopogon pratensis* L. (Asteraceae). Baudyš (1964) found larvae in 12, Skuhřavá (1964-1982) in 12 loc. Fr. gr. II sp. occ. scarcely. Alt. range 136 m at Látošovice (no. Boh.) - 502 m at Koclířov (Boh. Mor. Uplands). Max. occ. 200-300 m. It is a colline species

*Contarinia tremulae* Kieffer, 1909

Larvae live in leaf galls (rolled margins) on *Populus tremula* L. (Salicaceae). Baudyš (1916-1967) found galls in 12 loc. Fr. gr. II sp. occ. scarcely. Alt. range 231 m at Stará Voda near Hradec Králové (ea. Boh.) - 590 m at Rýmařov near Bruntál (no. Mor.). Max. occ. 300-400 m. It is a colline species

*Contarinia tritici* (Kirby, 1798)

Syn. *C. ventum* Vimmer, 1936, *C. bayeri* Vimmer, 1936

Larvae develop in the spikelets of *Triticum vulgare* L. (Poaceae). It is an inconspicuous and overlooked, but serious pest of wheat. Loss of seed results. Kirchner (1855) reported occ. at České Budějovice, Baudyš (1921) found damaged wheat at Vsetín. Skuhřavá (1979-1981) found larvae in 23 loc. Fr. gr. II sp. occ. scarcely. Alt. range 177 m at Strážnice (so. Mor.) - 470 m at Jenůvce (Boh.-Mor. Uplands). Max. occ. 200-300 m. It is a colline species with increasing population density. Fig. 13 C

*Contarinia valerianae* (Rübsaamen, 1890)

Larvae live in malformed inflorescences of *Valeriana officinalis* L. (Valerianaceae). Baudyš (1920-1921, 1925, 1954) found galls in the Česnekový údolí and Kamenný žleb valleys in about 1000 m on the hill side of the Mt. Prácheň in the Hrubý Jeseník Mts. Fr. gr. I sp. occ. solitarily. It is a mountain species

*Contarinia viburnorum* Kieffer, 1913

Larvae live in swollen flower buds of *Viburnum lantana* L. (Caprifoliaceae). Bayer (1914) and Baudyš (1925, 1954) found galls in 3 loc. at Brno. Drlíbek (1990) in several parks in Praha. Fr. gr. I sp. occ. solitarily. Alt. range 260 m at Praha (no. Boh.) - 635 m at Janovice near Rýmařov (no. Mor.). It is a colline species

*Contarinia vincetoxici* Kieffer, 1909

Larvae develop in flower bud galls on *Vincetoxicum officinale* Moench (Asclepiadaceae). Baudyš (1925, 1967) found galls in 3, Skuhřavá (1981) in one loc. Fr. gr. I sp. occ. solitarily. Alt. range 258 m at Adamov - 364 m at Ochoz near Brno (both in no. Mor.). It is a colline species

*Crataegobius corni* (Giraud, 1863)

Larvae produce large hard galls on the leaves of *Cornus sanguinea* L. (Cornaceae). Kirchner (1855) reported occurrence of galls at České Budějovice (so. Boh.), Hieronymus (1890) in Kyselka near Bílina (no. Boh.), Bayer (1910, 1912, 1914), Baudyš (1916-1967) and Čermák (1931, 1938) found galls in 50, Skuhřavá (1979, 1980, 1981) in 16 loc. At present it is sp. occ. scarcely (fr. gr. II), in the past it was more abundant (fr. gr. III). It seems to be a decreasing and disappearing species. Alt. range 177 m at Pouzdranské kopce-Hills (so. Mor.) - 601 m at Hřebeč near Koclířov (ea. Boh.). Max. occ. 200-300 m. It is a colline species. It is ranked as a vulnerable species. Fig. 16 A

*Cystiphora leontodontis* (Bremi, 1847)

Larvae cause pustule galls on the leaves of *Leontodon hispidus* L. (Asteraceae). Baudyš (1947, 1960) found galls in two loc. at Veverská Bítýčka, 234 m (so. Mor.) and at the hill Kotouč near Stramberk, 529 m (no. Mor.). Fr. gr. I sp. occ. solitarily. It is a colline species

*Cystiphora sanguinea* (Bremi, 1847)

Syn. *C. hieraci* F. Low, 1874, *C. pilosellae* Kieffer, 1892

Larvae produce pustule galls on the leaves of *Hieracium sylvaticum* (L.) L. (= *H. murorum* auct.) and *H. pilosella* L. (Asteraceae). Bayer (1910, 1912, 1914), Baudyš (1914-1968), Vimmer (1913, 1935) and Čermák (1925) found galls in 105, Skuhřavá (1957-1982) in 68 loc. At present it is sp. of moderate occ. (fr. gr. III) with decreasing population density. Alt. range 228 m at Šilheřovice (no. Mor.) - 1036 m at the peak part of Žalý in the Krkonoše

Mts. Max. occ. 300-400 m. It is a colline and submountain species and reaches into the mountain zone. Fig. 47 B.

*Cystiphora schmidtii* (Ruhsaamen, 1914)

Larvae cause pustule galls on the stems of *Chondrilla juncea* L. (Asteraceae). Baudys (1926) found galls only at one loc. at Hlady, 424 m in Bmo (so. Mor.). Fr. gr. I sp. occ. solitary. It is a colline species.

*Cystiphora sonchi* (Brenn, 1847)

Larvae produce pustule leaf galls on *Sonchus oleraceus* L. and *S. olerensis* L. (Asteraceae). Bayer (1912), Baudyš (1916-1968), Vinner (1925-1935), Černík (1940) and Sedláček (1957) found galls in 160, Skuhraiva (1957-1982) in 87 loc. At present fr. gr. IV sp. occ. considerably, with decreasing population density. Alt. range 162 m at Neratovice (m. Boh.)-890 m at Hojsova Straz in the Sumava Mts. Max. occ. 100-200 m. It is a planare and colline species and reaches into the submountain and the mountain zones. Fig. 42 A.

*Cystiphora taraxaci* (Kieffer, 1888)

Larvae cause pustule leaf galls on *Taraxacum officinale* Web. (Asteraceae). Bayer (1910, 1914), Baudys (1916-1967), Vinner (1907, 1913) and Černík (1931-1939) found galls in 110, Skuhraiva (1957-1982) in 184 loc. At present it is sp. of abundant occ. (fr. gr. V), with increasing population density, in the past it was not so abundant (fr. gr. IV). Alt. range 188 m at Předimice (m. Boh.)-1065 m at the peak part of Javorník in the Sumava Mts. Max. occ. 500-600 and 800-900 m. It is a submountain and mountain species and it occurs also in the colline zone. Fig. 44 C.

*Dasineura abietiperda* (Henschel, 1880)

Syn. *D. piceae* Henschel, 1881

A single larva lives in a small cavity in the bark or in the wood of the current year's growth of *Picea abies* (L.) Karst. (= *P. excelsa* Link.) (Pinaceae). Kowarz (1894) listed this sp. in his Catalogus. Baudys (1917, 1963) found damaged shoots in two, Skuhraiva (1959) also in two loc. Fr. gr. I sp. occ. solitary. Alt. range 232 m at Hlady (so. Mor.)-503 m at Jakubovice near Opava (no. Mor.). It is a colline species.

*Dasineura acrophila* (Wimmer, 1853)

Larvae produce pod-like galls on leaflets of *Fraxinus excelsa* L. (Oleaceae). Baudyš (1918-1968) found galls in 10, Skuhraiva (1957-1982) in 74 loc. At present it is sp. of moderate occ. (fr. gr. III), with increasing population density, in the past was not so abundant (fr. gr. I). Alt. range 184 m at Milečice near Hodonín (so. Mor.)-850 m at Libínské Sedlo near Prácheň in the Sumava Mts. Max. occ. 200-300 and 500-600 m. It is a colline and submountain species. Fig. 35 C.

*Dasineura acuminata* (Ruhsaamen, 1915)

Larvae cause galls on vegetative tops of *Campanula rapunculoides* L. (Campanulaceae). Baudys (1923-1926, 1960) found galls in 6, Skuhraiva (1964, 1979-1981) at 5 loc. Fr. gr. I sp. occ. solitary. Alt. range 192 m at Dolany near Kralupy nad Vltavou (m. Boh.)-547 m at Bruntal (no. Mor.). It is a colline species.

*Dasineura affinis* (Kieffer, 1886)

Larvae produce galls (curled and thickened leaf margins) on *Viola reichenbachiana* Jord. ex Boreau (= *V. sylvatica* Lam.), on other sp. and also on cultivated violets (Violaceae). Baudys (1916-1968) found galls in 28 and Skuhraiva (1957-1982) in 44 loc. At present fr. gr. III sp. occ. moderately, with increasing population density. Alt. range 210 m at Hrádko near Prostějov (so. Mor.)-955 m at Kraví hora in the Novohradské hory Mts. Max. occ. 200-300 m. It is a colline sp. and reaches up into the submountain and mountain zones. Fig. 41 C.

*Dasineura albipennis* (H. Loew, 1850)

Larvae cause small rosette galls on *Salix alba* L. (Salicaceae). Vinner (1913, 1935) determined adults bred from these galls which have been found in 4 loc. (Baudys's data regarding one wide swellings and designated as *Rhabdophaga albipennis* belong to another sp. and are not included here). Fr. gr. I sp. occ. solitary. Alt. range 287 m at Lhota-451 m at Jilemnice (both ca. Boh.). It is a colline species.

*Dasineura alopecuri* (Renter, 1895)

Larvae develop in florets of *Alopecurus pratensis* L. (Poaceae). Skuhraiva & Skuhraiva (1960) and Skuhraiva (1964-1974) found larvae in 6 loc. Fr. gr. I sp. occ. solitary. Alt. range 230 m at Detmichov near Olomouc (no. Mor.)-598 m at Dozice (we. Boh.). It is a colline species.

*Dasineura alpestris* (Kieffer, 1909)

Larvae cause galls on *Arabis alpina* L. and *A. hirsuta* (L.) Scop. (Brassicaceae). Baudys (1948) found galls in two loc. at Vlky near Kypov, 197 m, and at Lhota in Bmo, 300 m (both in so. Mor.) on cultivated *Arabis alpina* in gardens. Skuhraiva (1979) found galls at one loc. in the Botanical Garden at Píseňice, 306 m (m. Boh.). It is

primarily a mountain species restricted to its mountain and alpine host plant species and may occur secondarily on cultivated plants also in lower altitudinal zones

*Dasineura alyssi* (Kieffer, 1901)

Larvae cause fusiform swellings on stems of *Alyssum alyssoides* (L.) L. (= *A. calycinum* L.) (Brassicaceae). Baudys (1947) found galls on the Pavlovské vrchy Hills, about 200 m (most so. part of Mor.). Fr. gr. I sp. occ. solitary. It is a planare species.

*Dasineura angelicae* Rubsamen, 1915

Larvae live in swollen flower buds of *Angelica sylvestris* L. (Apiaceae). Baudys (1917, 1960) found galls only in three loc.: at Brady near Heim, 287 m, at Hodkovice nad Mohelkou, 455 m (both in ea. Boh.), and at the Kotouč Hill near Stramberk, 529 m (no Mor.). Fr. gr. I sp. occ. solitary. It is a colline species.

*Dasineura aparines* (Kieffer, 1889)

Larvae cause large galls on the growing tips of *Galium aparine* L. (Rubiaceae). Baudys (1916-1968) found galls in 17, Skuhřava (1980, 1981) in 13 loc. Fr. gr. I sp. occ. solitary. Alt. range: 182 m at Ostrožská Nová Ves (so Mor.) - 650 m at Jedlová near Pohodla (Boh.-Mor. Uplands). It is a planare and colline species and it reaches up to the submountain zone. Fig. 25 I.

*Dasineura armoraciae* Vimmer, 1936

Larvae cause flower bud galls on *Armoracia rusticana* G. (Brassicaceae). Vimmer (1936) described this sp. from the type locality at Hrušov (now a part of Olomouc) in no Mor. Baudys (1925-1966) and Vimmer (1936) found galls in 32, Skuhřava in 3 loc. In the past it was more abundant (fr. gr. II), at present sp. occ. solitary (fr. gr. II), with decreasing population density. Alt. range: 206 m at Hrušov - 709 m at Karlov pod Prácheňem (both in no Mor.). Max. occ. 200-400 m. It is a colline species and reaches up to the submountain zone. It is ranked as a vulnerable species. Fig. 32 E.

*Dasineura asperulae* (F. Low, 1875)

Larvae produce spongy galls on stems of *Asperula tinctoria* L. and *A. cynanchica* L. (Rubiaceae). Bayer (1912), Baudys (1912-1947) and Vimmer (1925-1936) found galls in 21, Skuhřava only at one loc. Fr. gr. I sp. occ. solitary, with decreasing population density. Alt. range: 183 m at Láje, d. Hladonín - 425 m at Hladonín Brno (both in so. Mor.). Max. occ. 200-300 m. It is a planare species and reaches up to the colline zone. It is ranked as a vulnerable species. Fig. 11 D.

*Dasineura astragalorum* (Kieffer, 1909)

Larvae live in swellings on stems of *Astragalus arenarius* L. and *A. glycyphyllos* L. (Fabaceae). Baudys (1916, 1920) found galls in two loc.: at Nouzov near Dymokury, d. Nymburk, 205 m (m. Boh.) and at Sloup Máčeň, d. Blansko, 471 m (so. Mor.). Fr. gr. I sp. occ. solitary. It is a colline species.

*Dasineura auritae* (Rubsamen, 1915)

Larvae cause marginal leaf rolls on *Salix aurita* L. and *S. cinerea* L. (Salicaceae). Baudys (1925-1967) found galls in 50, Skuhřava (1964-1982) in 47 loc. Fr. gr. III sp. occ. moderately, with stable population density. Alt. range: 260 m at Praha (m. Boh.) - 1060 m at the peak part of Velký Polom in the Hrubý Jeseník Mts. Max. occ. 400-500 m. It is a colline species and reaches up to the submountain and mountain zones. Fig. 40 E.

*Dasineura avillaris* (Kieffer, 1896)

Larvae cause oval axillary galls on *Trifolium medium* L. (Fabaceae). Baudys (1912-1965) found galls in 5 loc. Fr. gr. I sp. occ. solitary. Alt. range: 306 m at Bludov (no Mor.) - 452 m at Velký Bor near Horná Lhota (so. Boh.). It is a colline species.

*Dasineura bayeri* (Rubsamen, 1915)

Larvae produce galls at the vegetative tips of *Sisymbrium irio* L. (Brassicaceae). Bayer (1914), Baudys (1912-1939) and Vimmer (1925) found galls in 10, Skuhřava (1979) in 3 loc. Fr. gr. I sp. occ. solitary. Alt. range: 207 m at Brno Přurky (so. Mor.) - 550 m at the peak part of the Děvín Hill in the Pavlovské vrchy Hills. Max. occ. 200-300 m. It is a planare and colline species and penetrates into the submountain zone. Fig. 26 J.

*Dasineura berberidis* (Kieffer, 1909)

Larvae produce galls (rolled leaf margins) on *Berberis vulgaris* L. (Berberidaceae). Baudys (1920-1921) found galls only at one loc.: at Skalný nályn in the valley of the underground river Punkva, 497 m (so. Mor.) and Skuhřava (1972) also at one loc.: Slavkovský Chlumek near Slavkov, 787 m (so. Boh.). Fr. gr. I sp. occ. solitary. It is a submountain species.

*Dasineura bistortae* (Kieffer, 1909)

Larvae cause galls (loosely rolled leaf margins) on *Polygonum bistorta* L. (Polygonaceae) Bayer (1914), Baudyš (1920-1963) and Seidel (1957) found galls in 26, Skuhřava (1961-1982) in 16 loc. Fr. gr. II sp. occ. scarcely, with decreasing population density. Alt. range: 670 m at Kamenný (Boh.-Mor. Uplands) - 1491 m at the peak part of the Mt. Prádel in the Hrubý Jeseník Mts. Max. occ.: 1300-1500 m. It is a mountain and sub-Alpine species. Fig. 51 C.

*Dasineura brassicae* (Winnertz, 1853)

Larvae develop in swollen and prematurely ripening and yellowing siliques of *Brassica napus* L., *B. oleracea* L. and other host plant sp. of the family Brassicaceae. It is a serious pest. Kowarz (1894) reported this sp. in his *Catalogus Baudyš* (1912-1963), Vunmer (1913, 1936) and Černík (1934) found damaged siliques in 14, Skuhřava (1974-1982) in 28 loc. Fr. gr. II sp. occ. scarcely, with increasing population density. Alt. range: 215 m at Hustopeče (so. Mor.) - 618 m at Studená (Boh.-Mor. Uplands). Max. occ.: 200-300 m. It is a colline species. Fig. 26 A.

*Dasineura bupleuri* (Wachtl, 1883)

Larvae cause deformations of the growing points or of a single leaf of *Bupleium falcatum* L. (Apiaceae). Wachtl (1887) found galls at Znojmo, Baudyš (1916-1926) in 10, Skuhřava (unpublished) in one loc. at Koněprusy near Beroun, 368 m (no. Boh.). Fr. gr. I sp. occ. solitary. Alt. range: 215 m at Hustopeče - 497 m at Suchý žleb near Mladá (both in so. Mor.). Max. occ.: 200-300 m. It is a colline species and it is ranked as a disappearing and endangered species. Fig. 8 D.

*Dasineura campanulae* Ruhsaamen, 1914

Larvae live in swollen flower buds of *Campanula rotundifolia* L. (Campanulaceae). Vunmer (1925) and Baudyš (1920-1954) found galls in 6, Skuhřava (1979) in one loc. Fr. gr. I sp. occ. solitary. Alt. range: 298 m at Javorník in the Rychlebské hory Mts. (no. Mor.) - 536 m at Nova Ríše, d. Jihlava in the Boh.-Mor. Uplands. Max. occ.: 300-400 m. It is a colline species.

*Dasineura capsulae* Kieffer, 1901

Larvae produce hard galls on the growing points of *Euphorbia cyparissias* L. (Euphorbiaceae). Mik (1885) collected galls at Znojmo. Bayer (1910, 1912) and Baudyš (1916-1964) found galls in 21, Skuhřava (1957-1982) in 39 loc. Fr. gr. III sp. occ. moderately. Alt. range: 136 m at Litoměřice (no. Boh.) - 670 m at Bujanov, d. Český Krumlov (so. Boh.). Max. occ.: 300-400 m. It is a colline species and reaches up to the submountain zone.

*Dasineura cardaminicola* (Ruhsaamen, 1915)

Larvae produce swellings at the base of the leaf-stalks on *Cardamine amara* L. (Brassicaceae). Vunmer (1936) found galls at two loc.: at Jevany, 380 m, and at Louňovice, 437 m (both in no. Boh.). Fr. gr. I sp. occ. solitary. It is a colline species. Since 1936 it has not been found, it is a disappeared and extinct species.

*Dasineura cardaminis* (Winnertz, 1853)

Larvae live in swollen flower buds of *Cardamine pratensis* L. (Brassicaceae). Vunmer (1936), Baudyš (1920-1966) and Seidel (1957) found galls in 6 loc. Fr. gr. I sp. occ. solitary. Alt. range: 367 m at Hodkovice nad Mohelkou (no. Boh.) - 1400 m at the hill-side of the Mt. Prádel in the Hrubý Jeseník Mts. Max. occ.: 1300-1400 m. It is a mountain and sub-Alpine species. It occurs also in the colline and the submountain zones. It may be ranked as a disappeared and extinct species. Fig. 52 C.

*Dasineura cecconiana* (Kieffer, 1909)

Larvae live in galls on terminal parts of *Campanula trachelium* L. (Campanulaceae). Bayer (1914) and Baudyš (1954, 1962, 1968) found galls in 7 loc. Fr. gr. I sp. occ. solitary. Alt. range: 210 m at Píseň - 400 m at Hanušovice (both in no. Mor.). Max. occ.: 200-300 m. It is a colline species.

*Dasineura centaureae* (Kieffer, 1909)

Larvae live among deformed terminal leaves of *Centaurea montana* L. (Asteraceae). Baudyš (1925) found galls at Znojmo, 290 m (so. Mor.), but on *C. trunifolia* All. Fr. gr. I sp. occ. solitary. It is a colline species.

*Dasineura cerastii* (Binnie, 1877)

Larvae develop in terminal galls on stems of *Cerastium glomeratum* Thuill. (Caryophyllaceae). Baudyš (1917, 1947) found larvae in two loc.: at Píseň near Jičín, 265 m (no. Boh.) and at Bystrice pod Hostýnem, 315 m (no. Mor.). Fr. gr. I sp. occ. solitary. It is a colline species.



*Dasineura clausilia* (Brenn, 1847)

Syn *D. uehboldiana* Mik, 1886

Larvae cause galls (rolled leaf margins) on *Salix alba* L. (Salicaceae) Bayer (1910, 1914) and Baudyš (1967) found galls in 3 loc. at Železnice near Jičín, 321 m, at Rýchnov in the Krkonoše Mts, 1000 m (both in ea. Boh.), and at Velké Meziříčí, 427 m in the Boh.-Mor. Uplands Fr. gr. I sp. occ. solitary. It may be ranked as a polyzonal species (few data).

*Dasineura clavifex* (Kieffer, 1891)

Larvae produce thumb-shaped galls on the top of the twigs of *Salix aurita* L., *S. caprea* L. and *S. cinerea* L. (Salicaceae) Baudyš (1916-1967) and Vimmer (1935) found galls in 96, Skuhrová (1972-1982) in 123 loc. Fr. gr. IV sp. occ. considerably. Alt. range: 300 m at Nectava (so. Mor.) - 1065 m at the peak part of the Mt. Javorník in the Šumava Mts. Max. occ. 400-600 m. It is a colline and submountain species and reaches up to the mountain zone. Fig. 39 A.

*Dasineura comosae* (Ruhsaamen, 1915)

Larvae live in folded leaflets of *Hippocrepis emerus* L. (Fabaceae) Vimmer (1925) found galls at Bezděčín, di. Jihlonsko nad Nisou, 403 m (no. Boh.) Fr. gr. I sp. occ. solitary. It is a colline species.

*Dasineura corniculata* (Kieffer, 1909)

Larvae produce horn-shaped galls on the leaves of *Lantana alba* L. and *L. maculatum* L. (Lamiaceae) Baudyš (1947) found galls only at Heroltice near Tisnov, 304 m (so. Mor.), Skuhrová (1970) only at Kolínec near Sušice, 545 m (so. Boh.). It is a very rare sp. These findings are the only data about occurrence in Europe excepting the type-locality. Fr. gr. I sp. occ. solitary. It is a colline species.

*Dasineura crataegi* (Winnertz, 1853)

Larvae produce terminal rosette galls on *Crataegus oxyacantha* L. (Rosaceae) Brehm (1905), Bayer (1910, 1912, 1914), Baudyš (1916-1967), Vimmer (1931, 1936) and Čermák (1932) found galls in 100, Skuhrová (1957-1982) in 190 loc. Fr. gr. V sp. occ. abundantly, with increasing population density. Alt. range: 162 m at Nenetovice (ma. Boh.) - 848 m at the peak part of the Mt. Příhoda in the Český les Mts (we. Boh.). Max. occ. 100-400 m. It is a planare and colline species and reaches up into the submountain zone. Fig. 18 A.

*Dasineura dactylidis* Metcalf, 1933

Larvae live in the seed heads of *Dactylis glomerata* L. (Poaceae) Skuhrová (1964) found larvae at one loc. at Děčichov near Olomouc, 230 m (no. Mor.) Fr. gr. I sp. occ. solitary. It is a colline species.

*Dasineura daphnes* (Kieffer, 1901)

Larvae cause globular leaf galls on shoots of *Daphne genkium* L. (Thymelaeaceae) Bayer (1946) found galls at Malý Kosíř near Lhota pod Kosířem, 339 m, Baudyš (1947) at Bosonohy near Brno, 269 m, and at Zlobice near Krum, 228 m (all in so. Mor.). In Bohemia, galls have been found at the Holý vrch hill near Kokorín, 275 m (leg. A. Vinš, 15.6.1981), and at Loděnice-Na Čermácku, 376 m (leg. A. Jansová-Pešková, 15.6.1987) (both in ma. Boh.). Fr. gr. I sp. occ. solitary. It is a colline species. It is a disappearing species and is ranked as an endangered species.

*Dasineura dioicae* (Ruhsaamen, 1895)

Larvae cause curling of the leaf margins on *Urtica dioica* L. (Urticaceae) Baudyš (1940, 1954, 1964) found galls in 4, Skuhrová (1961) in 2 loc. Fr. gr. I sp. occ. solitary. Alt. range: 238 m at Střelice, di. Olava (no. Mor.) - 769 m at Péc pod Sněžkou in the Krkonoše Mts. Fr. gr. I sp. occ. solitary. It is a colline species.

*Dasineura dubiosa* (Kieffer, 1913)

Larvae cause spindle-shaped swellings of twigs of *Salix aurita* L. and *S. cinerea* L. (Salicaceae) Bayer (1910), Baudyš (1916-1963) and Vimmer (1935) found galls in 20, Skuhrová (1964, 1979) in 3 loc. Fr. gr. I sp. occ. solitary, with decreasing population density. Alt. range: 220 m at Jundrov, now a part of Brno (so. Mor.) - 775 m at Karlova Studánka in the Hrubý Jeseník Mts. Max. occ. 200-300 m. It is a colline species and reaches into the submountain zone.

*Dasineura epilobi* (F. Low, 1889)

Larvae live in swollen flower buds of *Epilobium angustifolium* L. (Onagraceae) Brehm (1905), Bayer (1914), Baudyš (1917-1966) and Vimmer (1925, 1936) found galls in 25, Skuhrová (1957-1982) in 76 loc. Fr. gr. IV sp. occ. considerably, with increasing population density. Alt. range: 213 m at Střelovice near Mělník (ma. Boh.) - 1065 m at the peak part of the Mt. Javorník in the Šumava Mts. Max. occ. 800-900 m. It is a mountain species which occurs, but in lower quantity, also in the submountain and the colline zones. Fig. 48 D.

*Dasineura erigeronis* Ruhsaamen, 1912

Larvae cause onion-shaped galls at the vegetative tops of *Erigeron acer* L. (Asteraceae). Baudyš (1954, 1960, 1964) found galls in 5 loc. Fr. gr. I sp. occ. solitary. Alt. range: 268 m at Hukovice near Vidnava, dr. Šumperk 5 - 415 m at the hill Šumáberk (both in no. Mor.). Max. occ.: 200-300 m. It is a colline species.

*Dasineura excavans* (Kieffer, 1909)

Larvae cause small depressions on the leaves of *Lonicera xylosteum* L. (Caprifoliaceae). Baudyš (1920-1964) found galls in 16, Skuhrová (1972) in one loc. Fr. gr. I sp. occ. solitary, with decreasing population density. Alt. range: 282 m at Sinošná near Jevíčko, dr. Svitavy (ea. Boh.) - 758 m at Kasperk, dr. Klatovy (we. Boh.). Max. occ.: 300-400 m. It is a colline species and it reaches up to the submountain zone. Fig. 32 D.

*Dasineura faurmai* (Kieffer, 1896)

Larvae live in swollen flower buds of *Lathyrus sylvestris* L. (Fabaceae). Baudyš (1925) found galls between the loc. Pouzdřany, 177 m, and Hustopeče, 215 m (so. Mor.), Skuhrová (1979) at Lochkov, 315 m (ea. Boh.). Fr. gr. I sp. occ. solitary. It is a planare and colline species.

*Dasineura festucae* (Barnes, 1939)

Larvae develop in the florets and seed cases of *Festuca rubra* L. (Poaceae). Skuhrová (1981) found larvae at the loc. Trstě, 545 m (so. Mor.). Fr. gr. I sp. occ. solitary. It is a colline species.

*Dasineura filicina* (Kieffer, 1889)

Larvae live in swollen rolled leaflet margins of *Pteridium aquilinum* (L.) Kuhn (Hypolepidaceae). Bayer (1912), Baudyš (1916-1954) and Čermík (1927, 1940) found galls in 8, Skuhrová (1957-1982) in 43 loc. Fr. gr. III sp. occ. moderately, with increasing population density. Alt. range: 243 m at Bělá near Uhuckelův, dr. Opava (no. Mor.) - 1065 m at the peak part of the Mt. Javorník in the Šumava Mts. Max. occ.: 500-600 m. It is a submountain and mountain species and it occurs also in the colline zone. Fig. 49 D.

*Dasineura filipendulae* (Kieffer, 1909)

Larvae live in swollen flower buds of *Filipendula vulgaris* Moench (Rosaceae). Baudyš (1947) found galls in one loc. at the hill Vsaucký Cih in the Vsetínské vrchy Hills (no. Mor.). Fr. gr. I sp. occ. solitary. It is a mountain species.

*Dasineura foliumerispans* (Ruhsaamen, 1896)

Larvae live on the lower side of the leaves of *Symphytum officinale* L. (Boraginaceae). Baudyš (1948, 1962, 1967) found galls in 4 loc. Fr. gr. I sp. occ. solitary. Alt. range: 200 m at Kojetín (so. Mor.) - 360 m at Jevíčko (ea. Boh.). It is a planare sp.

*Dasineura fraxinea* (Kieffer, 1907)

Larvae produce pustule galls on the leaflets of *Fraxinus excelsior* L. (Oleaceae). Baudyš (1923-1967) and Čermík (1932) found galls in 34, Skuhrová (1957-1982) in 324 loc. Fr. gr. V sp. occ. abundantly, with increasing population density. Alt. range: 162 m at Neratovice (m. Boh.) - 1120 m at the Mt. Roubín in the Šumava Mts. Max. occ.: 200-300 and 600-700 m. It is a colline species which occurs in the submountain and in the mountain zones. Fig. 35.A.

*Dasineura fraxini* (Brenn, 1847)

Larvae cause swellings of the mid-vein on the leaflets of *Fraxinus excelsior* L. (Oleaceae). Bayer (1910, 1912, 1914, 1946), Baudyš (1916-1962) and Čermík (1925, 1936, 1940) found galls in 40, Skuhrová (1954-1982) in 143 loc. Fr. gr. IV sp. occ. considerably, with increasing population density. Alt. range: 162 m at Neratovice (m. Boh.) - 955 m at the Mt. Kraví hora in the Novohradské hory Mts. Max. occ.: 200-400 m. It is a colline species which occurs also in the submountain and in the mountain zones. Fig. 35.B.

*Dasineura fructum* (Ruhsaamen, 1895)

Larvae live inside deformed seed covers of *Cerastium holosteoides* Fries (Caryophyllaceae). Baudyš (1948, 1966) found galls in 3 loc. Fr. gr. I sp. occ. solitary. Alt. range: 238 m at Turovice, dr. Třerov - 864 m at the hill Kelčský Javorník in the Hostýnské vrchy Hills (so. Mor.). It is a colline and submountain species and may be ranked as a disappearing and extinct species.

*Dasineura gallicola* (F. Löw, 1880)

Larvae form artichoke-shaped galls on *Galium uliginosum* L. (Rubiaceae). Bayer (1914), Baudyš (1916-1962) and Váňmner (1925, 1936) found galls in 24, Skuhrová (1971-1982) in 41 loc. Fr. gr. III sp. occ. moderately, with increasing population density. Alt. range: 215 m at Sentiň, dr. Pardubice (ea. Boh.) - 800 m at Hořejná Voda in the Novohradské hory Mts. (so. Boh.). Max. occ.: 500-800 m. It is a colline and submountain species. Fig. 31.B.



*Dasineura gemmicola* (Kieffer, 1896)

Larvae develop in swollen buds of *Salix aurita* L. and *S. cinerea* L. (Salicaceae) Baudyš (1940-1954) found galls in 5 loc. Fr gr I sp occ. solitary. Alt. range: 318 m at Lizevka near Dvůr Kralovské nad Labem (ca. Boh.) - 745 m at Rantzova di Sumpark (no Mor.). It is a submountain species.

*Dasineura gerani* (Kieffer, 1907)

Larvae live in swollen flower buds of *Geranium sanguineum* L. (Geraniaceae) Baudyš (1920-1954) found galls in 8 loc. Fr gr I sp occ. solitary. Alt. range: 233 m at the river Bečva - 1423 m at the Mt. Kralický Sněžník (both in no. Mor.). It is a mountain and sub-Alpine species. Fig. 52 D.

*Dasineura glechomae* (Kieffer, 1889)

Larvae cause galls on the growing points of *Glechoma hederacea* L. (Lamiaceae) Vimmer (1907, 1913), Bayer (1914) and Baudyš (1923-1965) found galls in 11. Skuhra (1959-1981) in 21 loc. Fr gr II sp occ. scarcely, with increasing population density. Alt. range: 167 m at Hodonín - 800 m at the hill Keleský Javorník in the Hostýnské vrchy Hills (both in so. Mor.). Max. occ.: 100-200 m. It is a planar and colline species. Fig. 21 B.

*Dasineura glycyphyllo* Ruhsaamen, 1912

Larvae live in swollen folded leaflets of *Asagallus glycyphyllos* L. (Fabaceae) Baudyš (1920-1965) found galls in 19. Skuhra (1964-1972-1982) in 5 loc. Fr gr I sp occ. solitary, with decreasing population density. Alt. range: 183 m at Čepel di Hodonín - 471 m at Sloup di Blansko (both in so. Mor.). Max. occ.: 100-300 m. It is a planar and colline species which may be ranked as a disappearing and endangered species.

*Dasineura heterotria* (H. Loew, 1850)

Larvae live in swollen deformed male catkins of *Salix triandra* L. (Salicaceae) Bayer (1910-1912, 1946), Baudyš (1912-1965), Vimmer (1913) and Čermák (1933, 1936) found galls in 200. Skuhra (1957-1964) in 31 loc. At present fr gr II sp occ. scarcely, with decreasing population density. Alt. range: 220 m at Svinov - 1013 m at the saddle Cervinohorské sedlo near Kouty nad Desnou (both in no. Mor.). It is a colline and submountain species and penetrates into the mountain zone.

*Dasineura hygrophila* (Mik, 1883)

Larvae produce globular leaf galls on the growing points of *Galium palustre* L. (Rubiaceae) Kowarz (1894) mentioned this sp. in his Catalogus. Vimmer (1913) and Baudyš (1916-1964) found galls in 17. Skuhra (1959-1982) in 41 loc. Fr gr III sp occ. moderately, with increasing population density. Alt. range: 198 m at Rozdávovice di Nymburk (mi. Boh.) - 1244 m at the peak part of the Mt. Klnovec in the Krusné hory Mts. (on *Galium hercynicum*). Max. occ.: 500-600 m. It is a mountain species inhabiting the planar up to mountain zones and penetrating into the sub-Alpine zone. Fig. 49 A.

*Dasineura hyperici* (Brenn, 1847)

Larvae cause leaf bud galls on *Hypericum perforatum* L. (Hypericaceae) Baudyš (1926-1968) and Čermák (1941) found galls in 100. Skuhra (1957-1982) in 422 loc. At present it is one of the most common species of the Czech Republic (fr gr VII) with increasing population density. Alt. range: 136 m at Látohrice (no. Boh.) - 1084 m at the peak part of the Mt. Klet at Český Krumlov (so. Boh.). Max. occ.: 400-500 m. It is a colline and submountain species which occurs in the planar, the submountain and the mountain zones. Fig. 46 C.

*Dasineura insignis* (Kieffer, 1906)

Larvae develop inside the lateral leaf buds of *Salix purpurea* L. (Salicaceae) Baudyš (1917, 1967) found galls in two loc. at Čermice di Náchod 297 m and at Želaznice di Jicin, 321 m (ca. Boh.). Fr gr I sp occ. solitary. It is a colline species.

*Dasineura irregularis* (Brenn, 1847)

Syn. *D. acerispanis* Kieffer, 1888

Larvae cause galls (wrinkled leaves) on *Acer pseudoplatanus* L. (Asteraceae) Bayer (1914), Baudyš (1916-1966) and Seidel (1957) found galls in 40. Skuhra (1959-1982) in 146 loc. Fr gr IV sp occ. considerably, with increasing population density. Alt. range: 137 m at J. dčnice (so. Mor.) - 840 m at the Mt. Svatoňov near Susice (so. Boh.). Max. occ.: 200-300 m. It is a colline species which penetrates into the submountain zone. Fig. 34 D.

*Dasineura neobla* (Kieffer, 1890)

Larvae produce rosette galls at the tops of *Salix caprea* L. (Salicaceae) Hieronymus (1890), Bayer (1910, 1912, 1914), Baudyš (1912-1967) and Čermák (1931-1933) found galls in 140. Skuhra (1961-1980) in 26 loc. Fr gr II sp occ. scarcely, with decreasing population density. Alt. range: 213 m at Strážovice near Melník (mi. Boh.) - 1036 m at the Mt. Žatý in the Křkonoše Mts. Max. occ.: 300-400 m. It is a colline and submountain species.

penetrating into the mountain zone Fig 39 C

*Dasineura karschi* (Kieffer, 1892)

Larvae cause swellings on branches of *Salix aurita* L. and *S. cinerea* L. (Salicaceae) Bayer (1910) and Baudyš (1916-1962) found galls in 10 loc. Fr. gr. I sp. occ. solitary. Alt. range: at Nové Dvory near Lipník nad Bečvou - Karlov pod Práedem (both in no. Mor.) Max. occ. 200-300 m. It is a colline species and reaches up to the submountain zone.

*Dasineura kellneri* (Henschel, 1875)

Syn. *D. laticis* F. Loew, 1878

Larvae induce galls in the buds of *Larix decidua* Mill. (Pinaceae) Bayer (1914, 1920), Baudyš (1916-1967) and Vimmer (1925, 1931) found galls in 50. Skuhrová (1957-1982) in 153 loc. Fr. gr. IV sp. occ. considerably, with increasing population density. It is a pest of European Larch and it is noted for fluctuations of population density. Alt. range: 162 m at Neratovice (m. Boh.) - 1070 m at Pláně in the Šumava Mts. Max. occ. 400-500 m. It is a colline and submountain species and penetrates into the mountain zone. Fig 34 B

*Dasineura kiefferiana* (Rübsaamen, 1891)

Larvae cause galls formed by rolled leaf margins on *Epilobium angustifolium* L. (Onagraceae) Bayer (1910, 1912, 1914), Baudyš (1916-1963) and Seidel (1957) found galls in 20. Skuhrová (1957-1982) in 61 loc. Fr. gr. III sp. occ. moderately, with increasing population density. Alt. range: 241 m at Brantice (no. Mor.) - 1129 m at the Mt. Radhošť in the Moravskoslezské Beskydy Mts. Max. occ. 500-600 m. It is a submountain and mountain species and occurs also in the colline zone. Fig 48 C

*Dasineura lami* (Kieffer, 1909)

Larvae induce galls in flower buds of *Lamium maculatum* L. (Lamiaceae) Bayer (1914) and Baudyš (1923-1968) found galls in 10. Skuhrová (1959-1981) in 15 loc. Fr. gr. II sp. occ. scarcely. Alt. range: 195 m at Chropyně, d. Kroměříž (so. Mor.) - 1036 m at the Mt. Žalý in the Krkonoše Mts. It is a colline and submountain species and penetrates into the mountain zone. Fig 47 D

*Dasineura lamicola* (Mik, 1888)

Larvae cause axillary and terminal bud galls on young shoots of *Lamium maculatum* L. (Lamiaceae) Baudyš (1917, 1920) and Vimmer (1925) found galls in 7 loc. Fr. gr. I sp. occ. solitary. Since 1925 the galls have not been found. Alt. range: 200 m at Mlýnská Chuchle, now a part of Praha (m. Boh.) - 471 m in the Pustý Žleb valley (so. Mor.) Max. occ. 200-300 m. It is a colline species and it may be ranked as a disappeared and extinct species. Fig 9 E

*Dasineura lathyri* (Kieffer, 1909)

Larvae cause pod-like galls on leaflets of *Lathyrus pratensis* L. (Fabaceae) Baudyš (1948) found galls in one. Skuhrová (1971-1982) in 52 loc. Fr. gr. III sp. occ. moderately. Alt. range: 227 m at Dolní Počernice (m. Boh.) - 850 m at the saddle Libinské Sedlo (so. Boh.) Max. occ. 300-500 m. It is a colline species and reaches up to the mountain zone. Fig 43 B

*Dasineura lathyricola* (Rübsaamen, 1890)

Larvae live in leaf bud galls on *Lathyrus pratensis* L. (Fabaceae) Baudyš (1912-1968) found galls in 23. Skuhrová (1957-1982) in 140 loc. Fr. gr. IV sp. occ. considerable, with increasing population density. Alt. range: 177 m at Strážnice (so. Mor.) - 1070 m at Pláně in the Šumava Mts. Max. occ. 200-500 m. It is a colline species and reaches up to the submountain and mountain zones. Fig 44 B

*Dasineura leguminicola* (Linné, 1879)

Larvae develop within the flowers of *Trifolium pratense* L. (Fabaceae) Skuhrová (1974-1982) found galls in 19 loc. Fr. gr. II sp. occ. scarcely. Alt. range: 215 m at Semtín - 850 m at Rokytnice (both in ea. Boh.) Max. occ. 400-500 m. It is a colline species and penetrates into the submountain zone.

*Dasineura lithospermi* (H. Loew, 1850)

Larvae cause rosette leaf galls on *Lithospermum officinale* L. (Borraginaceae) Baudyš (1925, 1947, 1967) found galls in 5 loc. Fr. gr. I sp. occ. solitary. Alt. range: 200 m at the Pouzdřanské kopce Hills - 291 m at Kuřim (so. Mor.) It is a colline species and may be ranked as a disappeared and extinct species. Fig 7 B

*Dasineura loewiana* Rübsaamen, 1917

Larvae live in pod-like malformations of the leaflets of *Vicia cracca* L. (Fabaceae) Bayer (1946) and Baudyš (1946, 1947) found galls in 8. Skuhrová (1964-1981) in 16 loc. Fr. gr. II sp. occ. scarcely. Alt. range: 162 m at Neratovice (m. Boh.) - 577 m at Roudno, d. Bruntál (no. Mor.) Max. occ. 100-200 and 500-600 m. It is a

planare and colline species

*Dasineura loewii* (Mik, 1882)

Larvae develop in globular galls on the top of flower stalks of *Euphorbia seguierana* Neck. (Euphorbiaceae) Baudyš (1923, 1925-1926) found galls in 7 loc. Fr. gr. I sp. occ. solitary. Alt. range: 226 m at Žďanice, d. Hodonín - 383 m at the hill Kamený kopec in Brno (both in so. Mor.). It is a colline species and may be ranged to disappeared and extinct species. Fig. 9 D.

*Dasineura totharingiae* (Kieffer, 1888)

Larvae cause galls at the top of stems and in swollen flower buds of *Cerastium glomeratum* Thuill. and other spp. (Caryophyllaceae). Baudyš (1917, 1925-1926) and Vimmer (1925) found galls in 6. Skuhra (1981) in one loc. Fr. gr. I sp. occ. solitary. Alt. range: 256 m at Prácheň (ea. Boh.) - 433 m at Keltovice (so. Mor.). It is a colline species and may be ranked as a disappearing and endangered species. Fig. 8 B.

*Dasineura lupulinae* (Kieffer, 1891)

Larvae cause pea-sized galls on the stems of *Medicago lupulina* L. (Fabaceae). Baudyš (1916-1965) found galls in 11. Skuhra (1977-1981) in 4 loc. Fr. gr. I sp. occ. solitary. Alt. range: 201 m at Kroměříž (so. Mor.) - 529 m at the hill Kotoč near Strančák (no. Mor.). Max. occ. 200-300 m. It is a colline species and may be ranked as a decreasing and vulnerable species. Fig. 21 D.

*Dasineura mali* (Kieffer, 1904)

Larvae cause galls (rolled leaf margin) on *Malus sylvestris* Mill. (Rosaceae). Bayer (1910, 1912, 1914), Baudyš (1916-1966) and Přihoda (1946) found galls in 33. Skuhra (1972-1982) in 49 loc. Fr. gr. III sp. occ. moderately, with increasing population density. Alt. range: 162 m at Neratovice (mi. Boh.) - 592 m at Větrušice (so. Boh.). Max. occ. 200-400 m. It is a colline species. Fig. 18 D.

*Dasineura marginemtorquens* (Bremer, 1847)

Larvae cause galls (rolled leaf margin) on *Salix viminalis* L. (Salicaceae). Bayer (1910), Baudyš (1912-1967) and Čermák (1931, 1936) found galls in 100. Skuhra (1957-1982) in 36 loc. Fr. gr. III sp. occ. moderately, with decreasing population density. Alt. range: 177 m at Nelahozeves (mi. Boh.) - 667 m at Chlumec nad Cidlavou (Boh. Mor. Uplands). Max. occ. 400-500 m. It is a colline species and penetrates into the submountain zone. Fig. 38 E.

*Dasineura medicaginis* (Bremer, 1847)

Syn. *D. ignota* (Wachtl, 1884)

Larvae produce leaf bud galls on shoots of *Medicago sativa* L. and *M. falcata* L. (Fabaceae). Bayer (1910, 1912, 1914), Baudyš (1912-1968) and Vimmer (1925) found galls in 300. Skuhra (1957-1982) in 153 loc. Fr. gr. IV sp. occ. considerably, at present with decreasing population density, in the past it was a serious pest of alfalfa. Alt. range: 136 m at Litoměřice (no. Boh.) - 645 m at Lipa (we. Boh.). Max. occ. 200-300 m. It is a colline species and it occurs also in the planare and submountain zones. Fig. 21 A.

*Dasineura myosotidis* (Kieffer, 1902)

Larvae live in swollen flower buds of *Myosotis palustris* (L.) Hill. (Boraginaceae). Baudyš (1916-1967) found galls in 7. Skuhra (1957-1982) in 26 loc. Fr. gr. II sp. occ. scarcely. Alt. range: 232 m at Zahradčany (no. Mor.) - 820 m at Kovarska (no. Boh.). Max. occ. 400-600 m. It is a colline and submountain species which penetrates into the mountain zone. Fig. 43 I.

*Dasineura nielsenii* (Kieffer et Nielsen, 1906)

Larvae cause swellings on the twigs of *Salix fragilis* L. (Salicaceae). Baudyš (1954) found galls only at one loc. at Chrást, 297 m (no. Mor.). Fr. gr. I sp. occ. solitary. It is a colline species.

*Dasineura uliperda* (Ruhsaamen, 1921)

Larvae develop in stunted leaf buds or slightly swollen twigs of *Salix auria* L. (Salicaceae). Baudyš (1940-1965) found galls in 4 loc. Fr. gr. I sp. occ. solitary. Alt. range: 220 m at Osoblaha - 578 m at Horní Hermaňice (no. Mor.). It is a colline species.

*Dasineura papaveris* (Winnertz, 1853)

Larvae live in the seed capsules of *Papaver rhoeas* L. and *P. dubium* L. (Papaveraceae). Baudyš (1920-1964) found larvae in 5. Skuhra (1972) in 2 loc. Fr. gr. I sp. occ. solitary. Alt. range: 136 m at Litoměřice (no. Boh.) - 472 m at Svrtec (so. Boh.). It is a colline species.

*Dasineura peineti* (Ruhsaamen, 1890)

Larvae live as inquiline in the galls of *Dasineura sanguisorbae* (Ruhs.) on *Sanguisorba officinalis* L. (Rosaceae). Skuhra (1980) found larvae at one loc. at Jablonné nad Orlicí, 421 m (ea. Boh.). Fr. gr. I sp. occ. solitary. It is

a colline species

*Dasineura periclymeni* (Rubsamen, 1889)

Larvae live in the marginal leaf rolls of *Lonicera periclymenum* L. and *L. nigra* L. (Caprifoliaceae) Baudyš (1920, 1961) found galls in 3, Skuhrová (1964, 1980) in 2 loc. Fr. gr. I sp. occ. solitarily. Alt. range 364 m at Vladislav (so. Mor.) - 1323 m at the Mt. Lysá hora in the Moravskoslezské Beskydy Mts. It is a submountain and mountain species and penetrates into the sub-Alpine zone.

*Dasineura phyteumatis* (F. Low, 1885)

Larvae live in swollen flower buds of *Phyteuma orbiculare* L. and *P. spicatum* L. (Campanulaceae) Dittreich (1912), Bayer (1914) and Baudyš (1920-1954) found galls in 12, Skuhrová (1961) in two loc. Fr. gr. I sp. occ. solitarily. Alt. range 378 m at Rožnov pod Radhoštěm (no. Mor.) - 1491 m at the peak part of Praděd in the Hrubý Jeseník Mts. Max. occ. 1300-1500 m. It is a mountain and sub-Alpine species and it occurs also in the submountain zone. It may be ranked as a disappearing and endangered species. Fig. 51 D.

*Dasineura pierreana* (Kieffer, 1909)

Larvae live in swellings at the tops of the branches of *Salix aurita* L. (Salicaceae) Baudyš (1924-1964) found galls in 6, Skuhrová (1971) in one loc. Fr. gr. I sp. occ. solitarily. Alt. range 271 m at Nová Hlávka (no. Mor.) - 718 m at Špičkatý Mlýn in the Krkonoše Mts. It is a submountain species.

*Dasineura pierrei* (Kieffer, 1896)

Larvae develop in chambers under the bark of the branches of *Salix aurita* L., *S. cinerea* L. and *S. caprea* L. (Salicaceae) Baudyš (1916-1960) found galls in 16 loc. Fr. gr. II sp. occ. scarcely. Alt. range 217 m at Hlučovice (no. Mor.) - 660 m at Malá Morávka in the Hrubý Jeseník Mts. Max. occ. 200-300 m. It is a colline and submountain species and may be ranked as a disappeared and extinct species.

*Dasineura phicaria* (H. Loew, 1850)

Larvae cause galls (twisted leaves) on *Rubus caesius* L. (Rosaceae) Bayer (1910) and Baudyš (1912-1968) found galls in 105, Skuhrová (1957-1982) in 235 loc. Fr. gr. V sp. occ. abundantly, with increasing population density. Alt. range 162 m at Neratovice (m. Boh.) - 890 m at Hojsova Stráž (we. Boh.) Max. occ. 100-400 m. It is a planare and colline species and penetrates up to the montane zone. Fig. 35 E.

*Dasineura populeti* (Rubsamen, 1889)

Larvae cause galls (rolled leaf margins) on *Populus tremula* L. (Salicaceae) Bayer (1910, 1914), Baudyš (1916-1969), Vimmer (1925) and Seidel (1957) found galls in 157, Skuhrová (1957-1982) in 333 loc. At present fr. gr. VI sp. occ. commonly, with increasing population density. Alt. range 162 m at Neratovice (m. Boh.) - 1065 m at Javorník in the Šumava Mts. Max. occ. 400-500 m. It is a colline and submountain species and penetrates into the mountain zone. Fig. 36 A.

*Dasineura populnea* (Kieffer, 1909)

Larvae develop in unopened buds of *Populus alba* L. (Salicaceae) Baudyš (1967) found it at Kroměříž, 201 m (so. Mor.) Fr. gr. I sp. occ. solitarily. It is a colline species.

*Dasineura potentillae* (Wachtl, 1885)

Larvae develop in swollen flower buds of *Potentilla argentea* L. (Rosaceae) Wachtl (1885) described this species based on material from the type-locality at Znojmo (so. Mor.). Bayer (1910, 1914), Baudyš (1916-1968) and Vimmer (1924, 1925) found galls in 80, Skuhrová (1957-1982) in 33 loc. Fr. gr. III sp. occ. moderately, with decreasing population density. Alt. range 229 m at Převýšov (ea. Boh.) - 638 m at the hll. Bezděz (m. Boh.) Max. occ. 400-500 m. It is a colline species and penetrates into the submountain zone. Fig. 30 E.

*Dasineura praeicola* (Kieffer, 1892)

Larvae live in swollen flower buds of *Lychnis flos-cuculi* L. (Caryophyllaceae) Baudyš (1948) found galls in two loc. at Dřevohostice, 239 m (no. Mor.) and at Netín, 538 m (so. Mor.) Fr. gr. I sp. occ. solitarily. It is a colline species.

*Dasineura pseudococcus* (Thomas, 1890)

Larvae live under the epidermis of the leaf of *Salix aurita* L., *S. cinerea* L. and *S. caprea* L. (Salicaceae) Thomas (1890) mentioned the loc. "Krč bei Prag", Kowarz (1894) gave this sp. in his Catalogus. Since that time this species has not been found again. Fr. gr. I sp. occ. solitarily. It is a colline species.

*Dasineura pteridicola* (Kieffer, 1901)

Larvae cause galls (folded leaf margin) on *Pteridium aquilinum* (L.) Kuhn (Hypolepidaceae) Baudyš (1916, 1926) found galls in 2, Skuhrová (1957-1982) in 29 loc. Fr. gr. II sp. occ. scarcely, with increasing population



density. Alt. range: 243 m at Bělá (no. Mor.) - 1343 m at Jezerní Stěna in the Šumava Mts. Max. occ.: 400-700 m. It is a submountain species and penetrates into the mountain and sub-Alpine zones. Fig. 49.F.

*Dasineura pulsatiellae* (Kieffer, 1894)

Larvae live in the flower heads and in the seeds of *Pulsatilla pratensis* (L.) Mill. subsp. *nigricans* (Störck) Zett. (Ranunculaceae). Skuhravá (1975) mentioned this sp. (found by A. Píthola) at one loc.: at the Baha hill near Křivoklát (mi. Boh.). Fr. gr. I: sp. occ. solitarily. It is a colline species.

*Dasineura pulvini* (Kieffer, 1891)

Larvae develop in bud galls on *Salix aurita* L. and *S. cinerea* L. (Salicaceae). Bayer (1914) and Baudyš (1916-1965) found galls in 100, Skuhravá (1961-1980) in 14 loc. At present fr. gr. II: sp. occ. scarcely, with decreasing population density. Alt. range: 262 m at Opočno (ea. Boh.) - 1070 m at Pláně in the Šumava Mts. It is a submountain species and penetrates into the mountain zone.

*Dasineura purpurea* (Barnes, 1935)

Larvae develop under the bark of the shoots of *Salix purpurea* L. (Salicaceae). Baudyš found damaged shoots in one loc.: at Jaroměřice, 368 m (ea. Boh.) and determined them as *Helicomyia saliciperda*. Fr. gr. I: sp. occ. solitarily. It is a colline species.

*Dasineura pustulans* (Rübsaamen, 1889)

Larvae develop in depressions of the leaves of *Filipendula ulmaria* (L.) Maxim. (Rosaceae). Bayer (1910, 1912, 1914) and Baudyš (1916-1968) found galls in 40, Skuhravá (1957-1982) in 129 loc. Fr. gr. IV: sp. occ. considerably, with increasing population density. Alt. range: 195 m at Chropyně (so. Mor.) - 1300 m at Kotelní Jámy in the Krkonoše Mts. Max. occ.: 500-600 m. It is a colline and submountain species which penetrates into the mountain and sub-Alpine zones. Fig. 49.C.

*Dasineura pyri* (Bouché, 1847)

Larvae cause rolling of leaf margins of *Pyrus communis* L. (Rosaceae). Bayer (1910) and Baudyš (1916-1966) found galls in 42, Skuhravá (1964-1982) in 75 loc. Fr. gr. IV: sp. occ. considerably, with increasing population density. Alt. range: 177 m at Nelahozeves (mi. Boh.) - 800 m at Dlouhá Louka (no. Boh.). Max. occ.: 200-400 m. It is a colline species and penetrates into the submountain zone. Fig. 18.B.

*Dasineura ramicola* (Rübsaamen, 1915)

Larvae develop in swellings of the twigs of *Salix purpurea* L. and *S. daphnoides* L. (Salicaceae). Bayer (1910, 1912, 1914), Čemík (1933) and Baudyš (1916-1967) found galls in 40 loc. Fr. gr. III: sp. occ. moderately. Alt. range: 183 m at Mutěnice (so. Mor.) - 578 m at Horní Heřmanice (no. Mor.). Max. occ.: 200-300 m. It is a colline species.

*Dasineura ranunculi* (Brenn., 1847)

Larvae cause galls (cornet-shaped rolled leaves) of *Ranunculus bulbosus* L. and *R. acris* L. (Ranunculaceae). Baudyš (1916-1968), Vimmer (1925) and Čemík (1940) found galls in 34, Skuhravá (1957-1982) in 74 loc. Fr. gr. III: sp. occ. moderately, with increasing population density. Alt. range: 175 m at Stará Boleslav (mi. Boh.) - 770 m at Rejvíz (no. Mor.). Max. occ.: 200-300 m. It is a colline and submountain species. Fig. 41.D.

*Dasineura repentis* Skuhravá, 1986

(*Rhabdophaga jaapi* Rübsaamen, 1915)

Larvae live in small rosette galls on *Salix repens* L. (Salicaceae). Baudyš (1920-1954) found galls in 4, Skuhravá (1980) in 4 loc. Fr. gr. I: sp. occ. solitarily. Alt. range: 287 m at Jičín (ea. Boh.) - 598 m at Nová Břtnice (so. Mor.). Max. occ.: 500-600 m. It is a colline and submountain species.

*Dasineura rosaria* (H. Loew, 1850)

Larvae cause large rosette galls on *Salix alba* L., *S. cinerea* L. and *S. caerulea* L. (Salicaceae). Hieronymus (1890), Bayer (1910, 1912, 1932), Vimmer (1905, 1913, 1935), Baudyš (1912-1967) and Čemík (1925, 1931, 1938) found galls in 400, Skuhravá (1957-1982) in 251 loc. At present fr. gr. V: sp. occ. abundantly, with a decreasing population density. Alt. range: 158 m at Břeclav (so. Mor.) - 1351 m at the peak part of the Mt. Šerák in the Hrubý Jeseník Mts. Max. occ.: 800-1000 m. It is a mountain species with wide ecological adaptation, inhabiting the colline, submountain and mountain zones and penetrating in the sub-Alpine zone. Fig. 50.C.

*Dasineura rossi* Rübsaamen, 1914

Larvae live in swollen leaflets of *Astragalus danicus* Retz (Faboaceae). Baudyš (1924) found galls in 2, Skuhravá (1982) in one loc. Fr. gr. I: sp. occ. solitarily. Alt. range: 183 m at Čejč (so. Mor.) - 457 m at the hill Raná (no. Boh.). It is a planare and colline species.

***Dasineura rubella* (Kieffer, 1896)**

Larvae cause galls on young leaves of *Acer campestre* L. (Aceraceae) Baudyš (1916-1963) found galls in 13, Skuhřava (1979, 1980, 1981) in 19 loc. Fr. gr. II sp. occ. scarcely. Alt. range: 175 m at Stará Boleslav (m. Boh.) - 497 m at Vládkovice (so. Mor.). Max. occ.: 100-300 m. It is a planare and colline species. Fig. 15 A.

***Dasineura ruebsaameni* (Kieffer, 1909)**

Larvae cause parenchymous galls on the leaves of *Carpinus betulus* L. (Corylaceae) Baudyš (1916, 1926, 1940, 1963) found galls in 7, Skuhřava (1975-1982) in 59 loc. Fr. gr. III sp. occ. moderately, with increasing population density. Alt. range: 184 m at Milotice (so. Mor.) - 680 m at Kani (no. Mor.). Max. occ.: 300-400 m. It is a colline species and penetrates into the submountain zone. Fig. 17 B.

***Dasineura salticperda* (Dufour, 1841)**

Larvae develop under the bark of the twigs of *Salix alba* L., *S. fragilis* L. and *S. caerulea* L. (Salicaceae) Bayer (1910), Baudyš (1916-1964), Čermík (1933) and Vimmer (1935) found damaged branches in 120, Skuhřava (1961-1980) in 5 loc. In the past it was more abundant (fr. gr. V), at present it occurs solitarily (fr. gr. I). It is sp. with decreasing population density. Alt. range: 193 m at Mochov (m. Boh.) - 1036 m at Žalý in the Krkonoše Mts. It is species with a wide ecological adaptation inhabiting all altitudinal zones. Fig. 39 B.

***Dasineura saltis* (Schrank, 1803)**

Larvae cause large swellings on the branches of *Salix emerea* L., *S. aurita* L. and *S. caprea* L. (Salicaceae) Kowarz (1894) mentioned this sp. in his Catalogus. Bayer (1910, 1912, 1914), Baudyš (1912-1967), Vimmer (1913, 1935) and Čermík (1925, 1927, 1931) found galls in 90, Skuhřava (1961-1982) in 92 loc. Fr. gr. IV sp. occ. considerably, with stable population density. Alt. range: 300 m at Kadaň (no. Boh.) - 1018 m at Serluch in the Orlické hory Mts. Max. occ.: 600-700 m. It is a submountain and mountain species, it occurs also in the colline zone. Fig. 39 D.

***Dasineura salviae* (Kieffer, 1909)**

Larvae live in swollen flower buds of *Salvia pratensis* L. and *S. nemorosa* L. (Lamiaceae) Bayer (1914), Baudyš (1947-1965) found galls in 14, Skuhřava (1979) in 2 loc. Fr. gr. I sp. occ. solitarily. Alt. range: 168 m at Kostice - 277 m at Bojkovice (both in so. Mor.). It is a planare species and may be ranked as a disappearing and endangered species. Fig. 7 D.

***Dasineura sampaina* (Tavarez, 1902)**

Larvae develop in terminal leaf bud galls on *Linum bienne* Mill. and *L. tenuifolium* L. (Linaceae) Baudyš (1914-1926) found galls in two loc. Fr. gr. I sp. occ. solitarily. Alt. range: 233 m at Diváky - 307 m at Stránská Skála in Brno (both in so. Mor.). It is a planare and colline species and may be ranked as a disappeared and extinct species.

***Dasineura sanguisorbae* (Ruebsaamen, 1890)**

Larvae develop in pod-like folded leaflets of *Sanguisorba officinalis* L. (Rosaceae) Hieronymus (1890), Baudyš (1912-1968) and Vimmer (1925) found galls in 26, Skuhřava (1957-1982) in 21 loc. Fr. gr. II sp. occ. scarcely. Alt. range: 220 m at Svinov (no. Mor.) - 670 m at Kamenický (so. Mor.). Max. occ.: 300-400 m. It is a colline species and penetrates into the submountain zone. Fig. 30 D.

***Dasineura saxifragae* (Kieffer, 1891)**

Larvae develop in swollen flower buds of *Saxifraga granulata* L. (Saxifragaceae) Baudyš (1923, 1947) and Čermík (1925) found galls in 5, Skuhřava (1979) in one loc. Fr. gr. I sp. occ. solitarily. Alt. range: 220 m at Olomouc (no. Mor.) - 638 m at Bezděz (no. Boh.). It is a colline species and penetrates into the submountain zone. It may be ranked as a disappearing and endangered species, since 1965 the galls have not been found.

***Dasineura schulzei* (Ruebsaamen, 1917)**

Larvae develop in leaf bud galls on *Euphorbia palustris* L. (Euphorbiaceae) Baudyš (1923, 1964) found galls in 3, Skuhřava (1981) in 4 loc. Fr. gr. I sp. occ. solitarily. Alt. range: 170 m at Bulhary - 500 m at Hostýn (both in so. Mor.). It is a planare and colline species.

***Dasineura serotina* (Winnertz, 1853)**

Larvae live in leaf bud galls on *Hypericum humifusum* L. (Hypericaceae) Bayer (1910, 1914, 1946), Baudyš (1916-1965) and Čermík (1940) found galls in 90 loc. Fr. gr. IV sp. occ. considerably. Alt. range: 200 m at Chuchle (m. Boh.) - 640 m Malé Vrbno (no. Mor.). It is a colline species.

***Dasineura silvestris* (Kieffer, 1909)**

Larvae live in flower bud galls of *Lathyrus silvestris* L. (Fabaceae) Bayer (1914) and Baudyš (1923) found galls



in 2 loc. Fr. gr. I sp. occ. solitary. Alt. range 233 m at Svätý Jan pod Skalou (m. Boh.) - 236 m at Břevčice nad Světlavou (so. Mor.). It is a colline species.

*Dasineura silvicola* (Kieffer, 1909)

Larvae cause axillary bud galls on *Stellaria holostea* L. (Caryophyllaceae). Baudyš found galls in 2 loc. Fr. gr. I sp. occ. solitary. Alt. range 242 m at Žitčín - 263 m at Hubálov (both in ea. Boh.). It is a colline species.

*Dasineura similis* (F. Low, 1888)

Larvae induce galls in the terminal leaf buds of *Veronica scutellata* L., *V. anagallis* L. and *V. beccabunga* L. (Scrophulariaceae). Baudyš (1916-1968) and Vimmer (1936) found galls in 22 loc. Fr. gr. II sp. occ. scarcely. Alt. range 176 m at Týrdenice - 580 m at Zúfár nad Sázavou (both in so. Mor.). Max. occ. 200-300 m. It is a colline species; it has disappeared from our area and is ranked as an extinct species. Fig. 26 B.

*Dasineura sisymbri* (Schränk, 1803)

Larvae cause spongy galls on stems and inflorescences of *Rorippa amphibia* (L.) Bess., *R. sylvestris* (L.) Bess. and *Barbarea vulgaris* R. Br. (Brassicaceae). Kowarz (1894) mentioned this sp. in his Catalogus. Bayer (1912, 1914, 1946), Vimmer (1913), Baudyš (1916-1968) and Čermík (1931, 1933, 1936) found galls in 120. Skuhřavá (1957-1982) in 30 loc. At present fr. gr. II sp. occ. scarcely, with decreasing population density; in the past it was more abundant (fr. gr. IV). Alt. range 162 m at Neratovice (m. Boh.) - 525 m at Sadoměřice (so. Boh.). Max. occ. 300-400 m. It is a colline species. Fig. 23 B.

*Dasineura spidicea* (Rubsamen, 1917)

Larvae live in pod-like swollen leaflets of *Vicia cracca* L. (Fabaceae). Baudyš (1925-1965) found galls in 90, Skuhřavá (1961-1982) in 9 loc. At present fr. gr. I sp. occ. solitary, in the past more abundant (fr. gr. IV), sp. with decreasing population density. Alt. range 318 m at Lešany (m. Boh.) - 554 m at Janovice (ea. Boh.). Max. occ. 400-500 m. It is a colline species.

*Dasineura stellariae* (Rubsamen, 1915)

Larvae cause brown ovoid galls at the growing points of *Stellaria holostea* L. (Caryophyllaceae). Baudyš (1926-1966) found galls in 7, Skuhřavá (1957) in 1 loc. Fr. gr. I sp. occ. solitary. Alt. range 216 m at Brno (so. Mor.) - 345 m at Nemile (no. Mor.). It is a colline species. Fig. 9 C.

*Dasineura strumosa* (Bremi, 1847)

Syn. *D. galeobdolonis* (Winnertz, 1853)

Larvae cause galls on young shoots of *Lamium galeobdolon* (L.) Nath. (Lamiaceae). Bayer (1910) and Baudyš (1916, 1924, 1926) found galls in 6, Skuhřavá in 14 loc. Fr. gr. II sp. occ. scarcely. Alt. range 257 m at Ústí (no. Mor.) - 1065 m at Javorník in the Sumava Mts. Max. occ. 300-400 m. It is a colline species which penetrates into the submountain and mountain zones. Fig. 47 E.

*Dasineura symphyti* (Rubsamen, 1891)

Larvae develop in swollen flower buds of *Symphytum officinale* L. (Boraginaceae). Baudyš (1916-1967) and Vimmer (1925, 1936) found galls in 48, Skuhřavá (1957-1982) in 58 loc. Fr. gr. III sp. occ. moderately. Alt. range 177 m at Strážnice (so. Mor.) - 661 m at Benešov nad Černou (so. Boh.). Max. occ. 100-300 m. It is a planare and colline species and penetrates into the submountain zone. Fig. 16 B.

*Dasineura szepligeti* (Kieffer, 1909)

Larvae cause galls on the growing points of *Campanula rapunculoides* L. (Campanulaceae). Baudyš (1925) found galls at one loc. at Hády in Brno, 424 m (so. Mor.). Fr. gr. I sp. occ. solitary. It is a colline species.

*Dasineura terminalis* (H. Loew, 1850)

Larvae produce terminal leaf bud galls on *Salix fragilis* L. and *S. alba* L. (Salicaceae). Bayer (1910, 1912, 1914), Baudyš (1912-1967), Vimmer (1925, 1936) and Čermík (1932, 1938, 1940) found galls in 200, Skuhřavá (1957-1982) in 175 loc. Fr. gr. V sp. occ. abundantly, with a tendency to decreasing population density. Alt. range 158 m at Břeclav (so. Mor.) - 850 m at Libínské Sedlo (so. Boh.). Max. occ. 300-400 m. It is a colline and submountain species. Fig. 39 E.

*Dasineura tetensi* (Rubsamen, 1891)

Larvae live in folded leaves of *Ribes nigrum* L. (Grossulariaceae). Baudyš (1917, 1920-21) and Vimmer (1936) found galls in 4, Skuhřavá (1980) in 2 loc. Fr. gr. I sp. occ. solitary. Alt. range 237 m at Rožtoky (m. Boh.) - 471 m at Sloup (so. Mor.). It is a colline species.

*Dasineura tetrali* (Kieffer, 1909)

Larvae develop in swollen flower buds of *Galeopsis tetralix* L. (Lamiaceae). Baudyš (1947, 1960) found galls in

two, Skuhřavá in one loc. Fr. gr. I sp. occ. solitary. Alt. range: 336 m at Ženklava (no. Mor.) - 500 m at Hostýn (so. Mor.). It is a colline species.

*Dasineura thomasi* (Kieffer, 1888)

Larvae induce galls on the leaf buds of *Tilia platyphyllos* Scop. and *T. cordata* Mill. (Tiliaceae). Baudyš (1912-1964) found galls in 20, Skuhřava (1957-1982) in 245 loc. At present fr. gr. V sp. occ. abundantly, with increasing population density, in the past it was not so abundant (fr. gr. II). Alt. range: 167 m at Hodonín (so. Mor.) - 955 m at Kraví hora in the Novohradské hory Mts. Max. occ.: 200-300 m. It is a colline species and penetrates into the submountain and the mountain zones. Fig. 33 A.

*Dasineura tiliae* (Schrank, 1803)

Syn. *D. ulamvohens* (Ruhsaenen, 1889)

Larvae cause galls (rolled leaf margins) on *Tilia platyphyllos* Scop. and *T. cordata* Mill. (Tiliaceae). Bayer (1910, 1912, 1914, 1946), Baudyš (1916-1967), Vunčer (1925) and Černík (1925, 1932) found galls in 80, Skuhřavá (1959-1982) in 75 loc. Fr. gr. IV sp. occ. considerably, with stable population density. Alt. range: 192 m at Valtice (so. Mor.) - 770 m at Rejvíz (no. Mor.). Max. occ.: 200-300 m. It is a colline species and penetrates to the submountain zone. Fig. 33 D.

*Dasineura tortilis* (Brenn, 1847)

Syn. *D. alii* (F. Low, 1877)

Larvae cause galls on the leaves of *Alnus glutinosa* (L.) Gaertn. and *A. incana* (L.) Moench (Betulaceae). Bayer (1910, 1914) and Baudyš (1916-1964) found galls in 60, Skuhřava (1957-1982) in 284 loc. At present fr. gr. V sp. occ. abundantly, with increasing population density. In the past it was not so abundant (fr. gr. III). Alt. range: 182 m at Ostrožská Nová Ves (so. Mor.) - 1070 m at Pláně in the Šumava Mts. Max. occ.: 500-700 m. It is a colline and submountain species and penetrates into the mountain zone. Fig. 37 D.

*Dasineura torrix* (F. Low, 1877)

Larvae live in terminal leaf bud galls on *Prunus spinosa* L. (Rosaceae). Bayer (1910, 1914) and Baudyš (1916-1966) found galls in 28, Skuhřavá (1972-1982) in 52 loc. At present fr. gr. III sp. occ. moderately, with increasing population density. In the past it was not so abundant (fr. gr. II). Alt. range: 182 m at Ostrožská Nová Ves (so. Mor.) - 674 m at Hořice na Šumavě (so. Boh.). Max. occ.: 300-400 m. It is a colline species which penetrates into the submountain zone. Fig. 20 E.

*Dasineura traili* (Kieffer, 1909)

Larvae develop in swollen flower buds of *Ranunculus acris* L. and *R. repens* L. (Ranunculaceae). Baudyš (1916-1964) found galls in 9 loc. Fr. gr. I sp. occ. solitary. Alt. range: 190 m at Židlochovice (so. Mor.) - 1503 m at the Mt. Vysoké Kolo in the Krkonoše Mts. It is a species with wide ecological adaptation occurring from the colline up to the sub-Alpine zones. Fig. 50 A.

*Dasineura triandraperta* (Barnes, 1935)

Larvae develop under the bark of *Salix mandra* L. (Salicaceae). Baudyš (1916, 1926) found damaged twigs in 3 loc. at Hostivar, 241 m (ma. Boh.), at Libuň, 320 m (ea. Boh.), at Laborec, 370 m (no. Boh.) (all findings designated by Baudyš as *Helicomyia salicaperda*). Fr. gr. I sp. occ. solitary. It is a colline species.

*Dasineura trifolii* (F. Low, 1874)

Larvae live in folded leaflets of *Trifolium repens* L. and *T. pratense* L. (Fabaceae). Baudyš (1912-1968) and Vunčer (1925, 1936) found galls in 150, Skuhřava (1957-1982) in 232 loc. At present fr. gr. V sp. occ. abundantly, with increasing population density, in the past it was not so abundant (fr. gr. IV). Alt. range: 136 m at Litoměřice (no. Boh.) - 1070 m at Pláně in the Šumava Mts. Max. occ.: 200-300 m. It is a colline species which penetrates into the submountain and mountain zones. Fig. 44 A.

*Dasineura tympani* (Kieffer, 1909)

Larvae cause pustule galls on the leaves of *Acer campestre* L. (Aceraceae). Bayer (1914) and Baudyš (1916-1966) found galls in 18, Skuhřava (1964-1982) in 57 loc. Fr. gr. III sp. occ. moderately, with increasing population density. Alt. range: 162 m at Nemtovice (ma. Boh.) - 600 m at Antonínov (no. Boh.). Max. occ.: 200-300 m. It is a colline species which penetrates into the submountain zone. Fig. 15 B.

*Dasineura ulmaria* (Brenn, 1847)

Larvae cause leaf galls on *Filipendula ulmaria* (L.) Maxim. (Rosaceae). Hieronymus (1890), Bayer (1910, 1912, 1914), Baudyš (1912-1968) and Černík (1931, 1938, 1942) found galls in 70, Skuhřavá (1957-1982) in 166 loc. Fr. gr. V sp. occ. abundantly, with increasing population density. Alt. range: 195 m at Chropyně (so. Mor.) - 1400

m at Pančická louka in the Krkonoše Mts. Max. occ. 500-600 m. It is a submountain species which penetrates into mountain and sub-Alpine zones. Fig. 49 B.

*Dasineura urticae* (Perris, 1840)

Larvae cause galls on leaves, stems and flower peduncles of *Urtica dioica* L. (Urticaceae). Hieronymus (1890), Kowarz (1894), Vimmer (1913), Bayer (1910, 1912, 1914), Baudyš (1916-1968) and Černík (1931) found galls in 160, Skuhrová (1957-1982) in 430 loc. At present, *D. urticae* is one of the most common species in the Czech Republic (fr. gr. VI), with increasing population density. Alt. range 136 m at Litoměřice (no. Boh.) - 1084 m at the peak part of the Mt. Klet (so. Boh.). Max. occ. 400-600 m. It is a colline and submountain species which penetrates into the mountain and, on the other side, also into the planare zones. Fig. 46 B.

*Dasineura viciae* (Kieffer, 1888)

Larvae develop in folded leaflets of *Vicia sepium* L. and other sp. (Fabaceae). Bayer (1910, 1912, 1914), Baudyš (1912-1968) and Vimmer (1925, 1936) found galls in 200, Skuhrová (1957-1982) in 192 loc. Fr. gr. V sp. occ. abundantly, with stable population density. Alt. range 136 m at Litoměřice (no. Boh.) - 1070 m at Planě in the Sázava Mts. Max. occ. 800-900 m. It is a submountain and mountain species which occurs also in the colline zone. Fig. 45 A.

*Dasineura violae* (F. Low, 1880)

Larvae cause rosette leaf galls on *Viola tricolor* L. ssp. *arvensis* Murr. (Violaceae). Hieronymus (1890), Bayer (1910) and Baudyš (1916-1968) found galls in 110, Skuhrová (1957-1982) in 85 loc. Fr. gr. IV sp. occ. considerably, with a decreasing population density. Alt. range 162 m at Nepřívě (im. Boh.) - 820 m at Kovárská (no. Boh.). Max. occ. 300-400 m. It is a colline species and penetrates into the submountain and mountain zones. Fig. 42 C.

*Dasineura virgaeureae* (Loebel, 1889)

Larvae develop in fusiform galls at the tops of *Solidago virgaurea* L. (Asteraceae). Bayer (1914), Baudyš (1916, 1925, 1954) and Černík (1939) found galls in 9, Skuhrová (1957-1982) in 39 loc. Fr. gr. III sp. occ. moderately, with increasing population density. Alt. range 282 m at Sluzovice (no. Mor.) - 1300 m at Zlaté Navrátky in the Krkonoše Mts. Max. occ. 400-600 m. It is a submountain and mountain species which penetrates into the sub-Alpine zone. Fig. 50 C.

*Dasineura vitisidaea* (Kieffer, 1909)

Larvae live in small leaf bud galls on *Vaccinium vitis-idaea* L. (Ericaceae). Baudyš (1923) and Skuhrová (1961) found galls only at Pančická louka, 1400 m, in the Krkonoše Mts. Fr. gr. I sp. occ. solitary. It is a sub-Alpine species. Fig. 52 A.

*Dasineura xylostei* (Kieffer, 1909)

Larvae cause parenchymous galls on the leaves of *Lonicera xylosteum* L. (Caprifoliaceae). Skuhrová (1981) found galls only at one loc. - at Veverská Bítýska, 234 m (so. Mor.). Fr. gr. I sp. occ. solitary. It is a colline species.

*Dichodiplosis langeti* Ruksaamen, 1910

Larvae develop in dried and mummified fruits of *Prunus spinosa* L. and *P. domestica* L. (Rosaceae). Skuhrová (1964, 1973, 1982) found larvae in 4 loc. Fr. gr. I sp. occ. solitary. Alt. range 136 m at Litoměřice (no. Boh.) - 487 m at Lomnická (no. Boh.). It is a colline species.

*Didymomyia ulmacea* (Brenn, 1847)

Syn. *D. reaumurtiana* (F. Low, 1878)

Larvae produce hard woody galls on the leaves of *Tilia platyphyllos* Scop. and *T. cordata* Mill. (Tiliaceae). Kuchner (1855), Hieronymus (1890), Vimmer (1905, 1907, 1913), Bayer (1910, 1912, 1914), Baudyš (1914-1968) and Černík (1933, 1936, 1938) found galls in 80, Skuhrová (1957-1982) in 147 loc. Fr. gr. IV sp. occ. considerably, with increasing population density. Alt. range 167 m at Hodonín (so. Mor.) - 770 m at the peat-bog Rejvíz (no. Mor.). Max. occ. 200-300 m. It is a colline species which penetrates into the submountain zone. Fig. 33 C.

*Diadaulus linariae* (Winnertz, 1853)

Larvae cause galls on the vegetative tips of the shoots *Linaria vulgaris* Mill. (Scrophulariaceae). Baudyš (1925, 1926, 1963) found galls in 4 loc. Fr. gr. I sp. occ. solitary. Alt. range 188 m at Popice (so. Mor.) - 692 m at Vysoké nad Jizerou (no. Boh.). It is a colline and submountain species.

*Diadaulus trutis* (Kieffer, 1889)

Larvae develop in swollen flower buds of *Pimpinella saxifraga* L. (Apiaceae). Baudyš (1917-1964), Vimmer

(1925, 1937) and Čermák (1938) found galls in 24, Skuhráv (1959-1981) in 4 loc. Fr. gr. I sp. occ. solitary, with decreasing population density. Alt. range: 230 m at Přerov (no. Mor.) - 526 m at Bělčice (so. Boh.). It is a colline species and may be ranked as a vulnerable species. Fig. 22 A.

*Drisina glutinosa* Giard, 1893

Larvae develop in small depressions on the lower surface of the leaves of *Acer pseudoplatanus* L. (Aceraceae). Baudyš (1923-1966) found galls in 26, Skuhráv (1964-1982) in 142 loc. At present fr. gr. IV sp. occ. considerably, with increasing population density. Alt. range: 175 m at Stará Boleslav (m. Boh.) - 1070 m at Pláně in the Šumava Mts. Max. occ. 600-700 m. It is a colline and submountain species which penetrates into the mountain zone. Fig. 34 E.

*Dryomyia circinans* (Giraud, 1861)

Larvae cause galls on the leaves of *Quercus cerris* L. (Fagaceae). Bayer (1914) and Baudyš (1925, 1926) found galls in 6, Skuhráv (1981) in 2 loc. Fr. gr. I sp. occ. solitary. Alt. range: 158 m at Břeclav - 424 m at Hádý (both in so. Mor.). Max. occ. 100-200 m. It is a planare and colline species. Fig. 14 A.

*Endopsylla agilis* Meyere, 1907

Larvae develop as endoparasites inside adults of *Psylla alni* L. (Psyllidae, Homoptera) living on *Alnus glutinosa* (L.) Quert. (Betulaceae). P. I. auterer found psyllids containing gall midge larvae on 8.7.1976 at Kerkovice, 433 m (so. Mor.) (unpublished). Fr. gr. I sp. occ. solitary. It is a colline species.

*Peltella tetranychi* Ruhsaamen, 1910

Larvae feed on free living mites *Tetranychus cucurbitae* (R. + P.) occurring on the leaves of *Humulus lupulus* L. (Cannabaceae). Vimmer (1931) found larvae at Rukovník, 322 m (m. Boh.). Fr. gr. I sp. occ. solitary. It is a colline species.

*Geocrypta braueri* (Handlirsch, 1884)

Larvae cause leaf bud galls on underground shoots of *Hypericum perforatum* L. (Hypericaceae). Handlirsch (1884) described this species based on material found at Vranov near Znojmo (so. Mor.). Baudyš (1917, 1954) found galls in 2, Skuhráv (1979) in one loc. Fr. gr. I sp. occ. solitary. Alt. range: 200 m at Chuchle (m. Boh.) - 709 m at Karlov pod Pradědem (no. Mor.). It is a colline species and penetrates into the submountain zone.

*Geocrypta galii* (H. Loew, 1850)

Larvae cause swellings on the stems of *Galium mollugo* L. and other spp. (Rubiaceae). Bayer (1910, 1914, 1946) and Baudyš (1916-1968) found galls in 220, Skuhráv (1957-1982) in 406 loc. *G. galii* is one of the most common species in the Czech Republic (fr. gr. VI), with increasing population density. Alt. range: 136 m at Latoměřice (m. Boh.) - 1065 m at Javorník in the Šumava Mts. Max. occ. 300-500 m. It is a planare and colline species and penetrates into the submountain and mountain zones. Fig. 46 D.

*Geocrypta trachelii* (Wachtl, 1885)

Larvae induce galls in the axillary buds of *Campanula rotundifolia* L. (Campanulaceae). Wachtl (1885), Baudyš (1912-1966) and Bayer (1914) found galls in 16, Skuhráv (1964, 1979) in 3 loc. Fr. gr. I sp. occ. solitary. Alt. range: 236 m at Kurdějov (so. Mor.) - 692 m at Vysoké nad Jizerou (ea. Boh.). Max. occ. 300-400 m. It is a colline species and penetrates into the submountain zone. It is disappearing and is ranked as an endangered species. Fig. 30 A.

*Gephyraulus raphanistri* (Kieffer, 1886)

Larvae develop in the swollen flower buds of *Raphanus raphanistrum* L. (Brassicaceae). Baudyš (1912-1968) found galls in 80, Skuhráv (1957-1982) in 63 loc. Fr. gr. III sp. occ. moderately, with decreasing population density. Alt. range: 188 m at Předměstí nad Jizerou (m. Boh.) - 848 m at the Mt. Půvda in the Český les Mts. Max. occ. 400-500 m. It is a colline species which penetrates into the submountain and the mountain zones. Fig. 42 D.

*Giraudiella inclusa* (Frauenfeld, 1862)

Larvae produce corn-like hard woody galls inside the stems of *Phragmites australis* (Cav.) Trin. (Poaceae). Baudyš (1940, 1964) found galls in 3, Skuhráv & Skuhráv (1960) in 5, Skuhráv (1974-1982) in 16, Skuhráv & Skuhráv (1981) in 49 loc. Fr. gr. II sp. occ. scarcely. Alt. range: 167 m at Hodonín (so. Mor.) - 452 m at Kačez (we. Mor.). Max. occ. 100-200 m. It is a planare and colline species. Fig. 12 B.

*Haplodiplosis marginata* (von Roser, 1840)

Larvae produce saddle-shaped depressions of the stems of *Triticum vulgare* Vill. and *Hordeum sativum* L. (Poaceae). It is a serious pest. The original host plant species is probably *Agropyron repens* (L.) PB. Baudyš (1923-1964)



found galls in 30, Skuhrová (1979, 1981) in 12 loc. Fr. gr. II sp. occ. scarcely. Alt. range 184 m at Pohorelice - 538 m at Chřov (so. Mor.). Max. occ. 200-300 m. It is a colline species with increasing population density and with two outbreaks during 1971-1975 and 1978-1983 (Skuhrová, Skuhrová & Brewer, 1993). Fig. 13 A.

*Harmandia cavernosa* (Ruhssamen, 1899)

Larvae produce large galls on the leaves of *Populus tremula* L. (Salicaceae). Bayer (1910-1946), Baudyš (1916-1969) and Čermák (1925) found galls in 115, Skuhrová (1957-1982) in 217 loc. Fr. gr. V sp. occ. abundantly, with increasing population density. Alt. range 162 m at Neratovice (m. Boh.) - 1070 m at Pláně in the Šumava Mts. Max. occ. 400-600 m. It is a colline species which penetrates into the submountain and mountain zones. Fig. 36 B.

*Harmandia globuli* (Ruhssamen, 1889)

Larvae produce small galls on the leaves of *Populus tremula* L. (Salicaceae). Bayer (1910-1946), Baudyš (1916-1969), Vimmer (1937) and Čermák (1925) found galls in 100, Skuhrová (1957-1982) in 173 loc. Fr. gr. V sp. occ. abundantly, with increasing population density. Alt. range 162 m at Neratovice (m. Boh.) - 1000 m at Rýchory in the Krkonoše Mts. Max. occ. 400-500 m. It is a colline species which penetrates into the submountain and mountain zones. Fig. 36 C.

*Harmandia populi* (Ruhssamen, 1917)

Larvae cause small galls on the leaves of *Populus tremula* L. (Salicaceae). Baudyš (1943-1967) found galls in 6, Skuhrová (1957-1982) in 166 loc. Fr. gr. V sp. occ. abundantly, with increasing population density. Alt. range 188 m at Přednáčice (m. Boh.) - 1000 m at Rýchory in the Krkonoše Mts. Max. occ. 400-500 m. It is a colline species which penetrates into the submountain and mountain zones. Fig. 36 D.

*Harmandia pustulans* Kieffer, 1909

Larvae cause pustule galls on the leaves of *Populus tremula* L. (Salicaceae). Bayer (1912, 1914) and Baudyš (1914-1967) found galls in 10 loc. Fr. gr. I sp. occ. solitarily. Alt. range 210 m at Brno (so. Mor.) - 776 m at Horní Planá (so. Boh.). Max. occ. 300-400 m. It is a colline species.

*Harmandia tremulae* (Winnertz, 1853)

Syn. H. loewi (Ruhssamen, 1892)

Larvae produce large galls on the leaves of *Populus tremula* L. (Salicaceae). Brehm (1905), Bayer (1910-1946), Baudyš (1916-1967) and Vimmer (1937) found galls in 60, Skuhrová (1957-1982) in 115 loc. Fr. gr. IV sp. occ. considerably, with increasing population density. Alt. range 260 m at Svoboda (so. Mor.) - 1013 m at Červenohorské sedlo in the Hrubý Jeseník Mts. Max. occ. 400-600 m. It is a colline and submountain species and penetrates into the mountain zone. Fig. 36 C.

*Harrisoniella vitrina* (Kieffer, 1909)

Larvae cause small galls on the leaves of *Acer pseudoplatanus* L. (Aceraceae). Bayer (1912) and Baudyš (1916-1968) found galls in 60, Skuhrová (1961-1982) in 109 loc. Fr. gr. IV sp. occ. considerably, with increasing population density and with outbreak in 1980-1984 (Skuhrová & Skuhrová 1986). Alt. range 300 m at Nectava (ea. Boh.) - 1065 m at Javorník in the Šumava Mts. Max. occ. 400-500 m and 800-900 m. It is a submountain and mountain species which occurs also in the colline zone. Fig. 34 C.

*Hartigola annulipes* (Harug, 1839)

Larvae produce cylindrical galls on the leaves of *Fagus sylvatica* L. (Fagaceae). Brehm (1905), Bayer (1910, 1912, 1914), Baudyš (1916-1967) and Seidel (1957) found galls in 74, Skuhrová (1957-1982) in 152 loc. Fr. gr. IV sp. occ. considerably, with increasing population density. Alt. range 219 m at Velehrad (so. Mor.) - 1120 m at Boubín in the Šumava Mts. Max. occ. 600-700 m and 1000-1200 m. It is a submountain and mountain species and occurs also in the colline zone. Fig. 40 B.

*Hybolasioptera cerealis* (Lindeman, 1881)

Larvae live in depressions of the stems of *Secale cereale* L., *Agropyron repens* (L.) PB. and other spp. (Poaceae). Baudyš (1916-1964) found galls in 23 loc. Fr. gr. II sp. occ. scarcely. Since 1964 it was not been found. Alt. range 204 m at Brno - 470 m at Květnice (both in so. Mor.). Max. occ. 200-300 m. It is a planare and colline species and is ranked as a the disappeared and extinct species.

*Iteomyia capreae* (Winnertz, 1853)

Larvae produce small globular galls on the leaves of *Salix caprea* L. and *S. aurina* L. (Salicaceae). Hieronymus (1890), Brehm (1905), Bayer (1910-1946), Baudyš (1912-1967), Čermák (1931-1938) and Seidel (1957) found galls in 270, Skuhrová (1957-1982) in 297 loc. Fr. gr. V sp. occ. abundantly, with stable population density. Alt.

range 188 m at Přednáčice nad Jizerou (m. Boh.) - 1351 m at Šerák in the Hrubý Jeseník Mts. Max. occ. 800-900 and 1200-1400 m. It is a mountain and sub-Alpine species which occurs also in the submountain and colline zones. Fig. 50 B.

*Jaapiella bryoniae* (Bouché, 1847)

Larvae cause leaf bud galls on *Bryonia alba* L. (Cucurbitaceae). Baudyš (1923-1966) and Vimmer (1931, 1935) found galls in 21, Skuhrová (1975-1982) in 17 loc. Fr. gr. II sp. occ. scarcely, with decreasing population density. Alt. range 168 m at Kostíce - 489 m at Čáslav (both in so. Mor.). It is a planare species and penetrates into the colline zone. Fig. 14 E.

*Jaapiella cirsicola* (Ruhsaamen, 1915)

Larvae live in poorly developed flower heads of *Cirsium arvense* (L.) Scop. (Asteraceae). Skuhrová (1959-1982) found larvae in 179 loc. Fr. gr. V sp. occ. abundantly. Alt. range 158 m at Břeclav - 1000 m at Zlatá Studně in the Šumava Mts. Max. occ. 300-500 m. It is a colline species which penetrates into the submountain and mountain zones. Fig. 44 D.

*Jaapiella clethropiella* Ruhsaamen, 1917

Larvae are inquiline in galls of *Dasineura tortilis* (Brenn.) on the leaves of *Alnus glutinosa* (L.) (Betulaceae). Baudyš (1946) found larvae in one, Skuhrová (1964) in two loc. Fr. gr. I sp. occ. solitary. Alt. range 230 m at Detřichov - 437 m at Domašov (both in no. Mor.). It is a colline species.

*Jaapiella compositarum* (Kieffer, 1888)

Larvae develop in flower heads of various species of the family Asteraceae. Baudyš (1916) found larvae at one loc. at Loreta near Jičín, 287 m, in *Cuscuta vulgaris* (Savi) Ten. Fr. gr. I sp. occ. solitary. It is a colline species.

*Jaapiella cucubali* (Kieffer, 1909)

Larvae live in swollen flower buds of *Cucubalus baccifer* L. (Caryophyllaceae). Baudyš (1966, 1967) found galls in 3 loc. Fr. gr. I sp. occ. solitary. Alt. range 197 m at Hezměrov - 238 m at Kamenice (all so. Mor.). It is a planare species and may be ranked as a the disappeared and extinct species.

*Jaapiella floriperda* (F. Low, 1888)

Larvae develop in swollen flower buds of *Silene vulgaris* (Moench) Garcke (Caryophyllaceae). Baudyš (1920-1968) found galls in 14, Skuhrová (1959-1982) in 40 loc. Fr. gr. III sp. occ. moderately, with increasing population density. Alt. range 158 m at Břeclav (so. Mor.) - 707 m at Bedřichov (no. Boh.). It is a colline and submountain species which occurs also in the planare zone. Fig. 24 B.

*Jaapiella genistamorquens* (Kieffer, 1888)

Larvae live among deformed leaves in galls on *Genista pilosa* L. (Fabaceae). Baudyš (1925-1965) found galls in 14, Skuhrová (1981) in 3 loc. Fr. gr. I sp. occ. solitary. Alt. range 195 m at Dolní Kounice - 433 m at Ketkovice (both in so. Mor.). It is a planare and colline species and is ranked as a the disappearing and endangered species. Fig. 10 E.

*Jaapiella genisticola* (F. Low, 1877)

Larvae cause leaf bud galls at the top of *Genista tinctoria* L. (Fabaceae). Hieronymus (1890), Bayer (1910, 1914) and Baudyš (1912-1965) found galls in 32, Skuhrová (1957-1982) in 49 loc. Fr. gr. III sp. occ. moderately, at present with decreasing population density. It disappeared from the territory of southern Moravia. Alt. range 230 m at Detřichov (no. Mor.) - 765 m at Lenora (so. Boh.). Max. occ. 500-600 m. It is a colline and submountain species. Fig. 31 C.

*Jaapiella hedicki* Ruhsaamen, 1921

Larvae live in swollen leaf sheaths of *Pimpinella saxifraga* L. (Apiaceae). Baudyš (1948, 1954, 1963) found galls in 5, Skuhrová (1957-1982) in 64 loc. Fr. gr. III sp. occ. moderately, with increasing population density. Alt. range 212 m at Živnice (ex. Boh.) - 906 m at the hll. Mařský vrch in the Šumava Mts. Max. occ. 400-600 m. It is a colline and submountain species which penetrates into the mountain zone. Fig. 41 B.

*Jaapiella jaapiana* (Ruhsaamen, 1914)

Larvae develop in folded leaflets of *Medicago lupulina* L. (Fabaceae). Bayer (1912), Baudyš (1916-1968) and Vimmer (1925, 1935) found galls in 34, Skuhrová (1979-1981) in 6 loc. At present fr. gr. I sp. occ. solitary, with decreasing population density. Alt. range 183 m at Karlín near Čejč (so. Mor.) - 529 m at the hll. Kotouč near Štramberk (no. Mor.). Max. occ. 200-300 m. It is a planare and colline species. It is ranked as a disappearing and vulnerable species. Fig. 21 E.



***Jaapiella knautiae* Rübsaamen, 1917**

Larvae live in leaf bud galls on *Knautia arvensis* L. (Dipsacaceae). Baudyš (1912-1963) found galls in 7, Skuhrová (1972-1982) in 12 loc. Fr. gr. II: sp. occ. scarcely. Alt. range: 237 m at Lháná (no. Mor.) - 1084 m at Kleť near Český Krumlov (so. Boh.). Max. occ.: 500-700 m. It is a colline and submountain species and penetrates into the mountain zone. Fig. 48.E.

***Jaapiella loticola* (Rübsaamen, 1889)**

Larvae live in leaf bud galls on *Lotus corniculatus* L. (Fabaceae). Baudyš (1912-1963) found galls in 30, Skuhrová (1957-1982) in 45 loc. Fr. gr. III: sp. occ. moderately, with increasing population density. Alt. range: 188 m at Písečnice (mi. Boh.) - 725 m at Přisecnice (no. Boh.). Max. occ.: 400-500 m. It is a colline species and penetrates into the mountain zone.

***Jaapiella medicaginis* (Rübsaamen, 1912)**

Larvae develop in folded leaflets of *Medicago sativa* L. and *M. falcata* L. (Fabaceae). Bayer (1910, 1914), Baudyš (1920-1963) and Vimmer (1925, 1931) found galls in 62, Skuhrová (1964-1982) in 70 loc. Fr. gr. III: sp. occ. moderately. Alt. range: 136 m at Litoměřice (no. Boh.) - 490 m at Drbákov (mi. Boh.). Max. occ.: 200-400 m. It is a planure and colline species. Fig. 21.C.

***Jaapiella moraviae* (Wachtl, 1883)**

Larvae live in swollen flower buds of *Lychnis viscaria* L. (Caryophyllaceae). Wachtl (1883) described this sp. based on material found at Znojmo (so. Mor.). Bayer (1914), Baudyš (1916-1966) and Čermík (1940) found galls in 8 loc. Fr. gr. I: sp. occ. solitarily. Since 1966 the galls have not been found; it is a disappeared species. Alt. range: 238 m at Turovice (no. Mor.) - 545 m at Třešť (so. Mor.). It is a colline species and is ranked as a extinct species. Fig. 26.E.

***Jaapiella rubicundula* (Rübsaamen, 1891)**

Larvae live in swollen flower buds of *Rumex acetosella* L. and *R. acetosa* L. (Polygonaceae). Vimmer (1936) found galls in one, Skuhrová (1979, 1980) in 6 loc. Fr. gr. I: sp. occ. solitarily. Alt. range: 225 m at Čepce (ea. Boh.) - 510 m at Kaulov (so. Boh.). It is a colline species.

***Jaapiella scabiosae* (Kieffer, 1888)**

Larvae live in leaf bud galls on *Scabiosa columbaria* L. (Dipsacaceae). Vimmer (1937) and Baudyš (1924, 1947) found galls in 3 loc. Fr. gr. I: sp. occ. solitarily. Alt. range: 162 m at Neratovice (mi. Boh.) - 470 m at Květnice (so. Mor.). It is a colline species. Since 1947 it has not been found, it is ranked as a disappeared species.

***Jaapiella schmidtii* (Rübsaamen, 1912)**

Larvae live in the seed capsules of *Plantago lanceolata* L. (Plantaginaceae). Bayer (1946) and Baudyš (1948, 1964) found larvae in 4, Skuhrová (1959-1982) in 300 loc. Fr. gr. V: sp. occ. abundantly, with increasing population density. Alt. range: 136 m at Litoměřice (no. Boh.) - 1065 m at Javorník in the Šumava Mts. Max. occ.: 300-500 m. It is a planure and colline species which penetrates into the submountain and mountain zones. Fig. 44.E.

***Jaapiella vacciniarum* (Kieffer, 1895)**

Larvae live among deformed leaves at the top of *Vaccinium myrtillus* L. (Ericaceae). Baudyš (1916-1967) found galls in 30, Skuhrová (1961-1982) in 16 loc. Fr. gr. II: sp. occ. scarcely, with decreasing population density. Alt. range: 360 m at Jevíčko (ea. Boh.) - 1491 m at Praděd in the Hrubý Jeseník Mts. It occurs in loc. lying in the colline and submountain zones mainly in cold places and in peat-bogs. It is a mountain and sub-Alpine species. Fig. 51.B.

***Jaapiella veronicae* (Vallot, 1827)**

Larvae produce leaf galls on the growing points of *Veronica chamaedrys* L. (Scrophulariaceae). Vimmer (1905-1936), Bayer (1910-1946), Baudyš (1916-1968), Čermík (1925, 1938) and Seidel (1957) found galls in 190, Skuhrová (1957-1982) in 501 loc. It is the most common gall midge species in the Czech Republic (fr. gr. VI), with increasing population density. Alt. range: 136 m at Litoměřice (no. Boh.) - 1084 m at Kleť near Český Krumlov (so. Boh.). It is ubiquitous without distinct demands (or relation) to one of the alt. zones. Its representation in all alt. zones from 100-1100 m includes more than 50 per centage in each zone. Fig. 46.A.

***Jaapiella viscaria* (Kieffer, 1886)**

Larvae develop in leaf bud galls on the top of *Lychnis viscaria* L. (Caryophyllaceae). Baudyš (1926, 1966) found galls in 3 loc. Fr. gr. I: sp. occ. solitarily. Alt. range: 365 m at Náměšť nad Oslovou - 452 m at Dobrá Voda (both in so. Mor.). It is a colline species.

*Janetiella volvens* Rubsaamen, 1917

Larvae live in rolled edges of the leaflets of *Lathyrus pratensis* L. (Fabaceae). Baudyš (1946) found galls in one, Skuhřavá (1972-1982) in 89 loc. Fr. gr. IV sp. occ. considerably. Alt. range 162 m at Neratovice (m. Boh.) - 775 m at Želňava (so. Boh.). Max. occ. 200-300 m. It is a colline species and penetrates into the submountain zone.

*Janetia cerris* (Kollar, 1850)

Larvae cause galls on the leaves of *Quercus cerris* L. (Fagaceae). Bayer (1914) and Baudyš (1923, 1925) found galls in 6, Skuhřavá (1979, 1980) in 4 loc. Fr. gr. I sp. occ. solitary. Alt. range 164 m at Zátolp - 424 m at Brno (both in so. Mor.). Max. occ. 100-200 m. It is a planare and colline species. Fig. 14 B.

*Janetia homocera* (F. Low, 1877)

Larvae produce galls on the leaves of *Quercus cerris* L. (Fagaceae). Bayer (1914) and Baudyš (1925) found galls in 2, Skuhřavá (1981) in one loc. Fr. gr. I sp. occ. solitary. Alt. range 173 m at Lednice - 424 m at Hady in Brno (so. Mor.). It is a planare and colline species.

*Janetia nervicola* (Kieffer, 1909)

Larvae cause swellings of leaf veins on *Quercus cerris* L. (Fagaceae). Baudyš (1916, 1925, 1926) found galls in 8 loc. Fr. gr. I sp. occ. solitary. Alt. range 164 m at Zátolp - 424 m at Hady in Brno (both in so. Mor.). It is a planare and colline species. Fig. 14 C.

*Janetia pustularis* (Kieffer, 1909)

Larvae produce small pustule galls on the leaves of *Quercus cerris* L. (Fagaceae). Bayer (1914) and Baudyš (1926) found galls in 3, Skuhřavá (1979, 1981) in 2 loc. Fr. gr. I sp. occ. solitary. Alt. range 167 m at Hodonín - 424 m at Hady in Brno (both in so. Mor.). It is a planare and colline species.

*Janetia szepligetii* Kieffer, 1896

Larvae cause pustule galls on the leaves of *Quercus cerris* L. (Fagaceae). Baudyš (1923) found galls in 2, Skuhřavá (1979, 1981) in 4 loc. Fr. gr. I sp. occ. solitary. Alt. range 185 m at Poděbrady (m. Boh.) - 390 m at Hlohoká nad Vltavou (so. Boh.) (leg. V. Skuhřavý, unpublished data). It is a planare and colline species. Fig. 14 D.

*Janetiella lemeei* (Kieffer, 1904)

Larvae produce galls on the leaves of *Ulmus minor* Mill. and other spp. (Ulmaceae). Bayer (1910, 1912, 1914), Baudyš (1916-1967) and Čermák (1933, 1937, 1940) found galls in 18, Skuhřavá (1957-1982) in 36 loc. Fr. gr. III sp. occ. moderately. Alt. range 162 m at Neratovice (m. Boh.) - 794 m at the hill Trémešný vrch near Rožmitál pod Třemšínem (m. Boh.). Max. occ. 100-300 m. It is a planare and colline species and penetrates into the submountain zone. Fig. 20 B.

*Janetiella siskiyoi* Felt, 1917

Larvae develop in the seeds of *Chamaecyparis lawsoniana* (Murray) Parl. (Cupressaceae). Skuhřavá (1979) mentioned this species (leg. by A. Přihoda in 1972) at Kostelec nad Černými lesy, 391 m (m. Boh.). Fr. gr. I sp. occ. solitary. It is a colline species, it was introduced into Europe from America with the plant seeds.

*Janetiella thymi* (Kieffer, 1888)

Larvae live in leaf bud galls of *Thymus serpyllum* L. and *T. chamaedrys* Fr. (Lamiaceae). Bayer (1910) and Baudyš (1912-1965) found galls in 34, Skuhřavá (1957-1982) in 26 loc. Fr. gr. II sp. occ. scarcely, with decreasing population density. Alt. range 215 m at Hač - 770 m at Rejvíz (both in no. Mor.). Max. occ. 200-300 m. It is a colline species and penetrates into the submountain zone. Fig. 41 E.

*Kaltenbachiola strobi* (Winnertz, 1853)

Larvae develop in swellings on the scales in the cones of *Picea abies* (L.) Karsten (Pinaceae). Baudyš (1917) and Čermák (1952) found galls in 3, Skuhřavá (1961, 1991) in 2 loc. Fr. gr. I sp. occ. solitary. Alt. range 287 m at Jičín (ea. Boh.) - 1000 m at Janovice (no. Mor.). It is a colline species which penetrates into the submountain and mountain zones.

*Lastoptera arundinis* Schner, 1854

Larvae produce a thickening and shortening of lateral shoots of *Phragmites australis* (Cav.) Trin. (Poaceae). Vunmer (1905) and Baudyš (1923-1964) found galls in 13, Skuhřavá (1959-1981) in 10, Skuhřavá & Skuhřavý (1981) in 49 loc. Fr. gr. I sp. occ. solitary. Alt. range 167 m at Hodonín (so. Mor.) - 452 m at Kačez (we. Boh.). Max. occ. 100-300 m. It is a planare species and penetrates into the colline zone. It is ranked as a vulnerable species. Fig. 12 A.

*Kiefferia pericarpicola* (Bremi, 1847)

Syn. *K. pimpinellae* (F. Low, 1874)

Larvae cause galls (swollen fruits) on *Pimpinella saxifraga* L., *P. major* (L.) Huds. and other sp. and genera of the family Apiaceae. Hieronymus (1890), Vunmer (1905-1937), Bayer (1910, 1912, 1914), Baudyš (1914-1968) and Černík (1925, 1940) found galls in 230, Skuhřava (1957-1982) in 268 loc. Fr. gr. V sp. occ. abundantly, with stable population density. Alt. range: 136 m at Litoměřice (no. Boh.) - 1065 m at Javorník in the Sumava Mts. Max. occ. 100-300 m. It is a planare and colline species and penetrates into the submountain and mountain zones. Fig. 45 E.

*Lasioptera calamagrostidis* Rubsamen, 1893

Larvae live under the leaf sheaths of *Calamagrostis epigeios* (L.) Roth. and other sp. of the family Poaceae. Baudyš (1925-1968) found galls in 50, Skuhřava (1957-1982) in 100 loc. Fr. gr. IV sp. occ. considerably, with increasing population density. Alt. range: 162 m at Neratovice (m. Boh.) - 820 m at Kovarska (no. Boh.). Max. occ. 300-400 m. It is a colline sp. and penetrates into the submountain zone. Fig. 27 A.

*Lasioptera carophila* F. Low, 1874

Larvae produce swellings on *Pimpinella saxifraga* L. and other sp. and genera of the family Apiaceae. Baudyš (1916-1966) found galls in 120 loc. and mentioned more than 40 host plant sp. Skuhřavá found galls in 89 loc. Fr. gr. IV sp. occ. considerably, with decreasing population density. Alt. range: 173 m at Lednice (so. Mor.) - 692 m at Kuklov (so. Boh.). Max. occ. 300-500 m. It is a colline species and penetrates into the planare and the submountain zones. Fig. 24 D.

*Lasioptera eryngii* (Vallot, 1829)

Larvae produce swellings on the stems of *Eryngium campestre* L. (Apiaceae). Kirchner (1855), Bayer (1910, 1914), Vunmer (1913, 1935) and Baudyš (1916-1966) found galls in 19, Skuhřava (1980, 1981) only in two loc. At present fr. gr. I sp. occ. solitarily, in the past it was more abundant. It is a disappearing species and has quite disappeared from the middle part of Bohemia where it occurred at the beginning of the 20th century (Skuhřavá 1987). Alt. range: 164 m at Poštoma - 473 m at Jinosov (so. Mor.). It is a planare and colline species. It is ranked as a endangered species.

*Lasioptera hungarica* Mohr, 1968

Larvae develop in mycelium inside the stems of *Phragmites australis* (Cav.) Trin. (Poaceae). Baudyš (1912-1954) found larvae in 4, Skuhřava (1974-1981) in 12, Skuhřava & Skuhřavý (1981) in 74 loc. Fr. gr. II sp. occ. scarcely. Alt. range: 167 m at Hodemín (so. Mor.) - 450 m at Doňov (so. Boh.). It is a planare and colline species. Fig. 12 C.

*Lasioptera kosarzewskella* Marikovskij, 1958

Larvae develop in the fruits of *Rhamnus catharticus* L. (Rhamnaceae). Skuhřavá (1979, 1980, 1981) found larvae in 7 loc. Fr. gr. I sp. occ. solitarily. Alt. range: 198 m at Rožďalovice (m. Boh.) - 324 m at Spy (ea. Boh.). It is a colline species.

*Lasioptera populnea* Wachtl, 1883

Larvae live asinquines in the galls of *Contarinia populi* (Rubs.). Skuhřavá (1959) found larvae in 3 loc. Fr. gr. I sp. occ. solitarily. Alt. range: 378 m at Kyjovice - 441 m at Hluhočec (both no. Mor.). It is a colline species.

*Lasioptera rubi* (Schrank, 1803)

Larvae develop in swellings of the stems of *Rubus idaeus* L. and other spp. (Rosaceae). Kirchner (1855), Bayer (1910, 1914), Vunmer (1925, 1935) and Baudyš (1912-1968) found galls in 280 loc. Baudyš mentioned more than 40 host plant spp. Skuhřava (1957-1982) found galls in 204 loc. Fr. gr. V sp. occ. abundantly, with decreasing population density. Alt. range: 173 m at Lednice (so. Mor.) - 1084 m at the Mt. Klet (so. Boh.). Max. occ. 200-400 m. It is a colline species and penetrates into the submountain and mountain zones and also occurs, but not so abundantly, in the planare zone. Fig. 35 D.

*Lasioptera tiliarum* H. Mamaeva, 1964

Larvae are inquines in the galls of *Contarinia tiliarum* (Kieffer). Three females were obtained on July 10, 1965, from galls collected in the loc. at Praha-Krč, 260 m (m. Boh.) (unpublished data), and two females in 1981 at Lednice, 173 m (so. Mor.) from material collected in flood plain forest (Vanhara 1986). Fr. gr. I sp. occ. solitarily. It is a colline species.

*Lathyromyza florum* Rubsamen, 1915

Larvae live in swollen flower buds of *Lathyrus sylvestris* L. (Fabaceae). Baudyš (1965) found galls in 4 loc. Fr. gr. I sp. occ. solitarily. Alt. range: 179 m at Uherské Hradiště - 252 m at Podivín (both in so. Mor.). It is a planare species.

*Lathyromyza schlechtendali* (Kieffer, 1886)

Larvae live in rolled leaflets of *Lathyrus linifolius* (Reich.) Bassl. and *L. tuberosus* L. (Fabaceae). Baudyš (1912-1926) found galls in 9 loc. Fr. gr. I sp. occ. solitary. Alt. range: 177 m at Pouzdrany - 424 m at Hádý in Brno (both in so. Mor.). It is a planare and colline species.

*Lestodiplosis jireni* (Kieffer, 1888)

Larvae are predators in galls of *Contarinia* sp. on *Filix platyphylla* Scop. (Liliaceae). Vimmer (1937) mentioned this sp. reared from galls which were found by Baudyš at the loc. Praha-Královská Ohra, 260 m (mi. Boh.). Fr. gr. I sp. occ. solitary. It is a colline species.

*Lestodiplosis holsteri* Kieffer, 1920

Larvae live free under the scales in the cones of *Picea abies* (L.) Karsten (Pinaceae). Křístek et al. (1976) found larvae in the cones of *Larix decidua* Mill. in 4 loc. Fr. gr. I sp. occ. solitary. Alt. range: 420 m at Vápenky - 600 m at Kuněky (so. Mor.). It is a colline and submountain species.

*Lestodiplosis longifilis* (Kieffer, 1901)

Larvae are predators of larvae developing on various fungi. A single male was reared on June 6th, 1973 from edalon in a spruce monoculture at Kuněky, 600 m (so. Mor.), in the framework of ecological studies of Vaňhara (1983). Fr. gr. I sp. occ. solitary. It is a submountain species.

*Lestodiplosis polypori* (H. Loew, 1850)

Larvae are predators of larvae on *Polyporus* spp. (Fungi). Kowarz (1894) mentioned this sp. in his Catalogus. Vimmer (1913) recorded it as there and there in the Šumava Mts. f. Skuhřavá (1979) found larvae on the surface of *Polyporus squamosus* at Jevany, 380 m (mi. Boh.). Fr. gr. I sp. occ. solitary. It is a colline and submountain species.

*Lestodiplosis raphani* Barnes, 1929

Larvae are predators of mites. A single male was determined from the material reared on June 8th, 1973, from edalon in a spruce monoculture at Kuněky, 600 m (so. Mor.). Fr. gr. I sp. occ. solitary. It is a submountain species.

*Lestodiplosis trifoli* Barnes, 1928

Larvae are predators of *Dastineira trifoli* (F. Low). A single male was determined from the material reared on June 5th, 1973 from edalon in a spruce monoculture at Kuněky, 600 m (so. Mor.). Fr. gr. I sp. occ. solitary. It is a submountain species.

*Loewiola centaureae* (F. Low, 1875)

Larvae produce galls on the leaves of *Centaurea scabiosa* L. and *C. jacea* L. (Asteraceae). Bayer (1910, 1914) and Baudyš (1916-1968) found galls in 92, Skuhřava (1959-1982) in 16 loc. At present fr. gr. II sp. occ. scarcely, with decreasing population density. Alt. range: 136 m at Latoměřice (no. Boh.) - 526 m at Kokašice (we. Boh.). Max. occ.: 200-400 m. It is a planare and colline species. It is ranked as a vulnerable species. Fig. 23 D.

*Loewiola serrataulae* Kieffer, 1905

Larvae produce swellings on the leaves of *Serratula tinctaria* L. (Asteraceae). Baudyš (1923) found galls in one loc. at Vrše near Kopidlno, 261 m (ea. Boh.). Fr. gr. I sp. occ. solitary. It is a colline species.

*Macrodiptosis dryobia* (F. Low, 1877)

Larvae cause marginal leaf galls on *Quercus robur* L. and *Q. petraea* (Matt.) Liebl. (Fagaceae). Hieronymus (1890), Bayer (1910-1946), Baudyš (1914-1967), Vimmer (1925, 1937) and Čermák (1939) found galls in 100, Skuhřava (1957-1982) in 183 loc. Fr. gr. V sp. occ. abundantly, with increasing population density. Alt. range: 173 m at Lednice (so. Mor.) - 770 m at Rejviz in the Hrubý Jeseník Mts. Max. occ.: 300-500 m. It is a colline species and penetrates into the submountain and also, but not so abundantly, into the planare zone. Fig. 19 A.

*Macrodiptosis volvens* Kieffer, 1895

Larvae produce leaf margin galls on *Quercus robur* L. and *Q. petraea* (Matt.) Liebl. (Fagaceae). Bayer (1910, 1914) and Baudyš (1916-1965) found galls in 60, Skuhřava (1959-1982) in 130 loc. Fr. gr. IV sp. occ. considerable, with increasing population density. Alt. range: 184 m at Milouze (so. Mor.) - 661 m at Benešov nad Černou (so. Boh.). Max. occ.: 200-500 m. It is a colline species and penetrates into the submountain zone. Fig. 19 B.

*Macrolabis cirsii* (Ruhsaamen, 1890)

Larvae live between achenes in flower heads of *Cirsium arvense* L. (Asteraceae). Baudyš (1916) found them in one loc. at Olhavec, 293 m (ea. Boh.). Fr. gr. I sp. occ. solitary. It is a colline species.



***Macrolabis heraclei* (Kaltenbach, 1862)**

Syn. *M. conugans* F. Low

Larvae live in crinkled young leaves of *Heracleum sphondylium* L. (Apiaceae) Baudys (1912-1968) and Vimmer (1925, 1935) found galls in 120, Skuhra (1957-1982) in 294 loc. At present fr. gr. V sp. occ. abundantly, with increasing population density. Alt. range: 173 m at Lednice (so. Mor.) - 1070 m at Planě in the Sumava Mts. Max. occ.: 200-400 m. It is a colline and submountain species and penetrates into the mountain zone. Fig. 48 A.

***Macrolabis hieraci* Ruhsaamen, 1917**

Larvae cause deformations at the top of the stem of *Hieracium sylvaticum* L. (Asteraceae) Hieronymus (1890) and Baudys (1916-1968) found galls in 34, Skuhra (1957-1982) in 63 loc. At present fr. gr. III sp. occ. moderately, with increasing population density. Alt. range: 215 m at Huf (no. Mor.) - 800 m at Dlouhá Louka (no. Boh.). Max. occ.: 300-400 m. It is a colline species and penetrates into the submountain zone. Fig. 31 A.

***Macrolabis holosteeae* Ruhsaamen, 1917**

Larvae cause galls at the growing tips of *Stellaria holostea* L. (Caryophyllaceae) Baudys (1926, 1948) found galls in 4, Skuhra (1979, 1980, 1981) in 10 loc. Fr. gr. I sp. occ. solitary. Alt. range: 198 m at Rozdávovice (no. Boh.) - 440 m at Dobruška near Bečyně (so. Boh.). It is a planare and colline species. Fig. 9 B.

***Macrolabis incolens* Ruhsaamen, 1895**

Larvae are inquiline in the galls of *Jaapiella veronicae* (Vallot) Skuhra (1973) found larvae in 2 loc. at Křenový, 367 m, and at Bělá nad Radbuzou, 450 m (we. Boh.). Fr. gr. I sp. occ. solitary. It is a colline species.

***Macrolabis jaapi* Ruhsaamen, 1915**

Larvae live in galls on the growing points of *Gallium aparine* L. (Rubiaceae) Baudys (1920-1962) and Vimmer (1935) found them in 25 loc. Fr. gr. II sp. occ. scarcely. Alt. range: 204 m at Černovice (so. Mor.) - 450 m at Hlince (se. Boh.). It is a colline species.

***Macrolabis lamii* Ruhsaamen, 1915**

Larvae cause galls at the growing tips of *Lamium album* L. (Lamiaceae) Baudys (1916-1965) and Vimmer (1935) found galls in 23, Skuhra (1957-1982) in 111 localities. Fr. gr. IV sp. occ. considerably, with increasing population density. Alt. range: 175 m at Stara Boleslav - 665 m at Andělská Hora (we. Boh.). Max. occ.: 200-300 m. It is a planare and colline species and penetrates into the submountain zone. Fig. 25 C.

***Macrolabis loniceræ* Ruhsaamen, 1912**

Larvae produce marginal leaf rolls of *Lonicera tatarica* L. and *L. xylosteum* L. (Caprifoliaceae) Vimmer (1925, 1931, 1935) and Baudys (1926) found galls in 4 loc. Fr. gr. I sp. occ. solitary. Alt. range: 185 m at Loupy (no. Boh.) - 424 m at Hady in Brno (so. Mor.). It is a colline species.

***Macrolabis lucii* Kieffer, 1898**

Larvae are inquiline in the galls of *Wachtelia rosarum* (Hardy) Skuhra (1964-1982) found larvae in 52 loc. Fr. gr. III sp. occ. moderately. Alt. range: 173 m at Lednice (so. Mor.) - 848 m at Prácheň in the Český les Mts. Max. occ.: 300-500 m. It is a colline species and penetrates into the submountain zone.

***Macrolabis orobi* (F. Low, 1877)**

Larvae produce galls (rolled leaf margins) of *Lathyrus vernus* (L.) Bernh. (Fabaceae) Baudys (1923-1965) found galls in 6, Skuhra (unpublished data) in 2 loc. at Solopyský, 300 m, dt. Loupy, and at the hill Milá, 300 m, in the České středohoří Mts. Fr. gr. I sp. occ. solitary. Alt. range: 177 m at Pouzdrany - 304 m at Heroltice (so. Mor.). It is a planare and colline species. It is ranked as a disappearing and endangered species. Fig. 7 A.

***Macrolabis pilosellæ* (Binnie, 1877)**

Larvae cause leaf bud galls on *Hieracium pilosella* L. (Asteraceae) Bayer (1912), Baudys (1916-1968) and Čermák (1940) found galls in 54, Skuhra (1964-1980) in 13 loc. At present fr. gr. II sp. occ. scarcely, with decreasing population density. Alt. range: 260 m at Praha (no. Boh.) - 1065 m at Javorník in the Sumava Mts. It is a colline and submountain species and penetrates into the mountain zone. It is ranked as a vulnerable species. Fig. 47 C.

***Macrolabis podagrariae* Stelter, 1962**

Larvae cause galls (folded leaflets) of *Aegopodium podagraria* L. (Apiaceae) Baudys (1912-1968) found galls in 66, Skuhra (1979-1982) in 34 loc. At present fr. gr. III sp. occ. moderately, with decreasing population density. Alt. range: 170 m at Stara Boleslav (no. Boh.) - 820 m at Kovarska (no. Boh.). Max. occ.: 300-400 m. It is a colline and submountain species. Fig. 41 A.

***Macrolabis ruebsaameni* Hedicke, 1938**

Larvae cause galls at the growing points of *Prunella vulgaris* L. (Lauraceae). Bayer (1912) and Baudyš (1916-1965) found galls in 18, Skuhrová (1957-1981) in 18 loc. Fr. gr. II sp. occ. scarcely, with stable population density. Alt. range 158 m at Brčclav - 745 m at Ranzova (no. Mor.). Max. occ. 200-300 m. It is a colline species and penetrates into the submountain zone. Fig. 24 A.

***Macrolabis saliceti* (H. Loew, 1850)**

Larvae are inquiline in the galls of *Dasineura terminalis* (H. Loew). Skuhrová (1980) found larvae in 3 loc. Fr. gr. I sp. occ. solitary. Alt. range 258 m at Borohádek - 373 m at Lanškroun (ea. Boh.). It is a colline species.

***Macrolabis stellariae* (Lichei, 1889)**

Larvae cause galls at the growing points of *Stellaria media* L. (Caryophyllaceae). Baudyš (1966) found galls in one, Skuhrová (1964, 1973) in two loc. Fr. gr. I sp. occ. solitary. Alt. range 480 m at Karlovice - 680 m at Tesák (both in no. Mor.). It is a submountain species.

***Mamaeva vysneci* Skuhrová, 1967**

Two males have been reared from soil samples at Vyšínec, 248 m, and at Záhry, 295 m (nu. Boh.). (Skuhrová 1967). The biology is unknown. Fr. gr. I sp. occ. solitary. It is a colline species.

***Massalongia rubra* (Kieffer, 1890)**

Larvae cause galls on the leaves of *Betula pendula* Roth. and *B. pubescens* Ehrh. (Betulaceae). Brehm (1905), Bayer (1914), Baudyš (1916-1954) and Vunmer (1937) found galls in 20, Skuhrová (1959-1982) in 26 loc. Fr. gr. II sp. occ. scarcely, with stable population density. Alt. range 201 m at Kromerž (so. Mor.) - 955 m at Kraví hora in the Novohradské hory Mts. Max. occ. 200-300 m. It is a colline and submountain species and penetrates into the mountain zone. Fig. 38 C.

***Mayetiola avenae* (Marchal, 1895)**

Larvae cause swellings on the stems of *Avena sativa* L. (Poaceae). Baudyš (1923, 1964) found galls in 2 loc. Fr. gr. I sp. occ. solitary. Alt. range 238 m at Podolí - 565 m at Žďár (both in so. Mor.). It is a colline species.

***Mayetiola baudysi* Ertel, 1975**

Larvae develop on the stems of *Agropyron repens* (L.) PB. (Poaceae). Ertel (1975) described this sp. based on material collected by Baudyš at Tanvald, 455 m (nu. Boh.). Fr. gr. I sp. occ. solitary. It is a colline species.

***Mayetiola bromicola* Roberti, 1953**

Larvae live under the leaf sheaths of *Bromus inermis* Leys. and other spp. (Poaceae). Baudyš found galls in one loc. at Hoštice, 306 m (so. Mor.). Fr. gr. I sp. occ. solitary. It is a colline species.

***Mayetiola dactylidis* Kieffer, 1896**

Larvae live under the leaf sheaths of *Dactylis glomerata* L. (Poaceae). Baudyš (1916-1964) found galls in 13 loc. Fr. gr. II sp. occ. scarcely. Alt. range 233 m at Vidnava - 709 m at Karlov pod Práchelem (both in no. Mor.). It is a colline and submountain species. Fig. 29 C.

***Mayetiola destructor* (Say, 1817)**

Larvae cause swellings on stems of *Triticum vulgare* L. and various other spp. of cereals and weed grasses (Poaceae). It is a serious pest in many countries of the world (Skuhrová, Skuhrový & Brewer 1984). In our territory Kirchner (1855), Kowarz (1894), Vunmer (1913) and Baudyš (1916-1960) found galls in 9 loc. Fr. gr. I sp. occ. solitary. Alt. range 220 m at Benátky - 675 m at Rymarov (both in no. Mor.). It is a colline species and penetrates into the submountain zone. Fig. 29 B.

***Mayetiola hellwigi* (Ruebsaamen, 1912)**

Larvae live in depressions on the stem of *Brachypodium sylvaticum* (Huds.) PB. and *B. pinnatum* (L.) PB. (Poaceae). Baudyš (1920) and Vunmer (1931, 1935) found galls in 23 loc. Fr. gr. II sp. occ. scarcely. Alt. range 176 m at Kralupy nad Vltavou (nu. Boh.) - 708 m at Fryšava (so. Mor.). It is a colline species and penetrates into the submountain zone.

***Mayetiola holci* Kieffer, 1896**

Larvae live at the stem base of *Holcus mollis* L. and *H. lanatus* L. (Poaceae). Baudyš (1916-1968) found galls in 12, Skuhrová (1959) in one loc. Fr. gr. II sp. occ. scarcely. Alt. range 233 m at Vidnava - 709 m at Karlov pod Práchelem (both in no. Mor.). It is a colline species and penetrates into the submountain zone. Fig. 29 D.

***Mayetiola lanceolatae* (Ruebsaamen, 1895)**

Larvae live under the leaf sheaths of the shortened stems of *Calamagrostis canescens* (Web.) Roth. (Poaceae). Baudyš (1916, 1926, 1940) and Bayer (1920) found galls in 6, Skuhrová (1961-1982) in 5 loc. Fr. gr. I sp. occ.



solitarily. Alt. range: 258 m at Jesení (no. Boh.) - 1244 m at Klínovec in the Krkonoše Mts. It is a colline and submountain species and penetrates up to the sub-Alpine zone.

*Mayetiola molinae* (Ruhssamen, 1895)

Larvae live under the leaf sheaths of *Molinia caerulea* (L.) Moench (Poaceae). Baudyš (in Ertel, 1975) found galls in one loc. at Hukovice, 268 m (no. Mor.). Fr. gr. I sp. occ. solitarily. It is a colline species.

*Mayetiola phularis* Barnes, 1928

Larvae cause swellings at the base of the stems of *Phalaris arundinacea* L. (Poaceae). Baudyš (1926) found galls at Třešť, 345 m (no. Mor.). Ertel (1975) mentioned the loc. Kobylá near Vidnava, 354 m (no. Mor.) where Baudyš in 1952 found these galls. Fr. gr. I sp. occ. solitarily. It is a colline species.

*Mayetiola poae* (Bosc, 1817)

Larvae produce swellings above nodes on the stems of *Poa nemoralis* L. (Poaceae). Brehm (1905), Bayer (1910, 1912, 1914), Vimmer (1905, 1907, 1913), Baudyš (1916-1968) and Čermík (1938) found galls in 100, Skuhřavá (1959-1982) in 45 loc. At present fr. gr. III sp. occ. moderately, with decreasing population density. Alt. range: 220 m at Svinov - 800 m at Pustevny on the peak part of the Mt. Radhošť in the Moravskoslezské Beskydy Mts. It is a colline species and penetrates up to the boundary of the mountain zone. Fig. 29 A.

*Mayetiola ventricola* (Ruhssamen, 1899)

Larvae cause swellings on the stem base of *Molinia caerulea* (L.) Moench (Poaceae). Ertel (1975) stated that Baudyš found galls in 1954 at Hukovice, 268 m (no. Mor.). Fr. gr. I sp. occ. solitarily. It is a colline species.

*Microstapira flexuosa* (Wimmer, 1853)

Larvae live in terminal parts of unflowering stems of *Phragmites australis* (Cav.) Trin. (Poaceae). Prof. J. Jeník found attacked stems on October 10th, 1972, at the Nesyt pond, 187 m (so. Mor.) (Skuhřavá & Skuhřavý 1981). Fr. gr. I very rare. It is a planare species.

*Miktola fagi* (Hartig, 1839)

Larvae cause pointed galls on the leaves of *Fagus sylvatica* L. (Fagaceae). Kirschner (1855), Hieronymus (1890), Kowarz (1894), Brehm (1905), Bayer (1910-1914), Vimmer (1913-1937), Baudyš (1916-1967), Čermík (1925) and Seidel (1957) found galls in 100, Skuhřavá (1957-1982) in 162 loc. Fr. gr. IV sp. occ. considerably, with increasing population density. Alt. range: 211 m at Černošice (mi. Boh.) - 1120 m at Boubín in the Šumava Mts. Max. occ. 1000-1100 m. It is a mountain species and occurs also in the submountain and colline zones. Fig. 40 A.

*Mikomya coryli* (Kieffer, 1901)

Larvae cause small leaf galls on *Corylus avellana* L. (Corylaceae). Baudyš (1923, 1926, 1960) found galls in 6, Skuhřavá (1964-1982) in 140 loc. At present fr. gr. IV sp. occ. considerably, with increasing population density. Alt. range: 173 m at Lednice (so. Mor.) - 881 m at Lipka (so. Boh.). Max. occ. 400-600 m. It is a colline and submountain species. Fig. 32 A.

*Monarthropalpus flavus* (Schrank, 1776)

Syn. *M. buxi* (Lahoulbène, 1873)

Larvae cause blister-like leaf galls on *Buxus sempervirens* L. (Buxaceae). Skuhřavá & Skuhřavý (1960) and Skuhřavá (1979) reported occ. only in 4 loc., but galls occur more frequently on cultivated shrubs in parks and in city gardens. Fr. gr. I sp. occ. solitarily. Alt. range: 173 m at Lednice (so. Mor.) - 375 m at Konopiště (mi. Boh.). It is a colline species.

*Monodiplosis liebeli* (Kieffer, 1889)

Larvae areinquilines in the galls of *Macrodiptosis dryobii* (F. Löw) and *M. volvens* Kieffer. Skuhřavá (1979) found larvae in 4 loc. Fr. gr. I sp. occ. solitarily. Alt. range: 202 m at Radotín (mi. Boh.) - 510 m at Kadoč (so. Boh.). It is a colline species.

*Mycodiplosis kraussei* (Wolf, 1910)

Larvae are mycophagous on mouldy grains of various sp. of cereals. Skuhřavá (1981) found larvae at one loc. at Kostelec na Hané, 240 m (so. Mor.). Fr. gr. I sp. occ. solitarily. It is a colline species.

*Mycodiplosis melampsorae* (Ruhssamen, 1889)

Larvae feed on uredospores of *Melampsora salicina* Lev. (Basidiomycetes) on the leaves of *Salix caprea* L. (Salicaceae). Skuhřavá (1972-1982) found larvae on 51 loc. Fr. gr. III sp. occ. moderately. Alt. range: 233 m at Heřticejn (no. Mor.) - 1070 m at Pláně in the Šumava Mts. Max. occ. 400-600 m. It is a colline and submountain species and penetrates into the mountain zone.

***Mycodiplosis plasmoparae* Rübsaamen, 1906**

Larvae feed on various rusts (Basidiomycetes) developing on infected plant tissues. Skuhřavá (1971) found larvae in two loc. Fr. gr. I: sp. occ. solitarily. Alt. range: 260 m at Praha (m. Boh.) - 510 m at Kádov (so. Boh.). It is a colline species.

***Mycodiplosis saundersi* Barnes, 1927**

Larvae feed on uredospores of *Puccinia suaveolens* (Pers.) Rostr. (Basidiomycetes) on the leaves of *Cirsium arvense* (L.) Scop. (Asteraceae). Skuhřavá (1971-1982) found larvae in 58 loc. Fr. gr. III: sp. occ. moderately. Alt. range: 223 m at Chlumec nad Cidlinou (ea. Boh.) - 775 m at Želňava (so. Boh.). Max. occ.: 300-400 m. It is a colline species and penetrates into the submountain zone.

***Neomikiella beckiana* (Mik, 1885)**

Larvae produce terminal or lateral leaf bud galls on *Inula conyzs* DC. (Asteraceae). Baudyš (1917-1962) found galls in 9 loc. Fr. gr. I: sp. occ. solitarily. Alt. range: 230 m at Kmsko (m. Boh.) - 561 m at Jívoví (no. Mor.). It is a colline species. Since 1962 it has not been found; it is ranked as a disappeared and extinct species. Fig. 22.D.

***Neomikiella lychnidis* (Heyden, 1861)**

Larvae cause terminal or lateral leaf bud galls on *Melandrium album* (Mill.) Garcke (Caryophyllaceae). Baudyš (1947, 1966) found galls in 4 loc. Fr. gr. I: sp. occ. solitarily. Alt. range: 167 m at Hodonín - 183 m at Bzenec (both in so. Mor.). It is a planare species. Since 1966 it has not been found; it is ranked as a disappeared and extinct species. Fig. 7.E.

***Oligotrophus juniperinus* (Linné, 1758)**

Larvae induce galls on the terminal or lateral buds of *Juniperus communis* L. (Cupressaceae). Kirchner (1855) and Baudyš (1912-1963) found galls in 6, Skuhřavá (1971-1980) in 19 loc. Fr. gr. II: sp. occ. scarcely, with increasing population density. Alt. range: 227 m at Bojkovice (so. Mor.) - 1003 m at Kubova Huť in the Šumava Mts. Max. occ.: 400-500 m and 800-1000 m. It is a submountain and mountain species and occurs also in the colline zone. Fig. 34.A.

***Oligotrophus panteli* Kieffer, 1898**

Larvae cause large galls on *Juniperus communis* L. (Cupressaceae). Bayer (1910, 1914) and Baudyš (1916-1963) found galls in 15 loc. Fr. gr. II: sp. occ. scarcely. Alt. range: 258 m at Bělkovice (no. Mor.) - 580 m at Žďár nad Sázavou (so. Mor.). Max. occ.: 200-300 m. It is a colline species and penetrates into the submountain zone.

***Oligotrophus schmidtii* Rübsaamen, 1914**

Larvae produce small galls on the twigs of *Juniperus communis* L. (Cupressaceae). Baudyš (1954) mentioned this species as occurring in Silesia, without detailed data. Fr. gr. I: sp. occ. solitarily. It is a submountain species.

***Ozirhincus anthemidis* (Rübsaamen, 1915)**

Larvae develop in swollen achenes of *Anthemis arvensis* L. (Asteraceae). Skuhřavá (1957-1982) found galls in 53 loc. Fr. gr. III: sp. occ. moderately. Alt. range: 162 m at Neratovice (m. Boh.) - 694 m at Ostružná (no. Mor.). Max. occ.: 200-400 m. It is a colline species and penetrates into the submountain zone.

***Ozirhincus longicollis* Rondani, 1840**

Syn. *Clinorhyncha chrysanthemi* H. Loew, 1850

Larvae develop in swollen achenes of *Chrysanthemum leucanthemum* L. (Asteraceae). Baudyš (1912, 1926) found galls in 3, Skuhřavá (1964-1981) in 14 loc. Fr. gr. II: sp. occ. scarcely. Alt. range: 162 m at Neratovice (m. Boh.) - 890 m at Hořsova Stráž (we. Boh.). It is a colline species and penetrates into the submountain and mountain zones.

***Ozirhincus millefolii* (Wachtl, 1884)**

Larvae develop in the swollen achenes of *Achillea millefolium* L. (Asteraceae). Wachtl (1884) described this species based on material collected at Znojmo, 290 m (so. Mor.). Bayer (1912) collected galls at Praha, 260 m (m. Boh.). Skuhřavá (1957-1982) found galls in 48 loc. Fr. gr. III: sp. occ. moderately. Alt. range: 158 m at Břeclav (so. Mor.) - 815 m at Dlouhá Louka (no. Boh.). It is a planare and colline species and penetrates into the submountain and mountain zones.

***Ozirhincus tanacetii* (Kieffer, 1889)**

Larvae live in swollen achenes of *Tanacetum vulgare* L. (Asteraceae). Skuhřavá (1957-1982) found galls in 87 loc. Fr. gr. IV: sp. occ. considerably. Alt. range: 173 m at Lednice (so. Mor.) - 800 m at Dlouhá Louka (no. Boh.). Max. occ.: 300-400 m. It is a colline species and penetrates into the submountain zone. Fig. 27.D.

*Paradiplosis abietis* (Hubaút, 1945)

Larvae develop inside the needles of *Abies alba* Mill. (Pinaceae). Skuhrava (1979, 1980) found galls in 6 loc. Fr. gr. I sp. occ. solitary. Alt. range: 228 m at Zlechovice (ea. Boh.) - 486 m at Pošná (so. Mor.). It is a colline species which is ranked as a disappearing species. Fig. 15 E.

*Parallelodiplosis bupleuri* (Ruhsaamen, 1895)

Larvae develop in swollen deformed fruits of *Bupleium falcatum* L. (Apiaceae). Skuhrava (1972) found galls in one loc. at Pšovanka, 475 m (we. Boh.). Fr. gr. I sp. occ. solitary. It is a colline species.

*Parallelodiplosis galliperda* (F. Low, 1889)

Larvae develop under the galls of *Neuroterus quercus-haccorum* L. (Cynipidae, Hymenoptera) on the leaves of *Quercus robur* L. and *Q. petraea* (Matt.) Liehl. (Fagaceae). Skuhrava (1974, 1981) found larvae in 25 loc. Fr. gr. II sp. occ. scarcely. Alt. range: 173 m at Lednice (so. Mor.) - 550 m at Sach (so. Boh.). Max. occ.: 100-300 m. It is a planare and colline species and penetrates into the submountain zone.

*Phegomyia fagicola* (Kieffer, 1901)

Larvae cause leaf galls on *Fagus sylvatica* L. (Fagaceae). Baudys (1920, 1923, 1954) and Seidel (1957) found galls in 8, Skuhrava (1961-1979) in 5 loc. Fr. gr. I sp. occ. solitary. Alt. range: 306 m at Bludov (no. Mor.) - 1120 m at Boudln in the Šumava Mts. Max. occ.: 1000-1100 m. It is a mountain species and also occurs, but rarely, in the colline and submountain zones. Fig. 40 D.

*Physemococcus hartigi* (Liechle, 1892)

Larvae cause parenchymous galls on the leaves of *Tilia platyphyllos* Scop. and *T. cordata* Mill. (Tiliaceae). Bayer (1914, 1946), Baudys (1916-1968) and Černík (1933) found galls in 50, Skuhrava (1964-1982) in 258 loc. At present fr. gr. V sp. occ. abundantly, with increasing population density. Alt. range: 167 m at Hodonín (so. Mor.) - 881 m at Lipka (so. Boh.). Max. occ.: 200-500 m. It is a colline species and penetrates into the submountain and mountain zones. Fig. 33 B.

*Physemococcus ulmi* (Kieffer, 1909)

Larvae cause pustule galls on the leaves of *Ulmus minor* Mill. and other spp. (Ulmaceae). Bayer (1912, 1914) and Baudys (1916-1967) found galls in 60, Skuhrava (1964-1982) in 97 loc. Fr. gr. IV sp. occ. considerably, with increasing population density. Alt. range: 136 m at Litoměřice (no. Mor.) - 850 m at Lábníčko Sedlo (so. Boh.). Max. occ.: 100-300 m. It is a planare and colline species and penetrates into the submountain and mountain zones. Fig. 20 A.

*Placochela ligustri* (Ruhsaamen, 1899)

Larvae cause flower bud galls of *Ligustrum vulgare* L. (Oleaceae). Baudys (1954) found galls in one, Skuhrava (1977-1982) in 28 loc. Fr. gr. II sp. occ. scarcely. Alt. range: 192 m at Valtice (so. Mor.) - 550 m at Plana (we. Boh.). Max. occ.: 200-300 m. It is a colline species and penetrates into the submountain zone. Fig. 16 B.

*Placochela nigripes* (F. Low, 1877)

Larvae live in swollen flower buds of *Sambucus nigra* L. (Caprifoliaceae). Bayer (1910) and Baudys (1926-1964) found galls in 8, Skuhrava (1957-1982) in 72 loc. Fr. gr. III sp. occ. moderately, with increasing population density. Alt. range: 177 m at Strážnice (so. Mor.) - 687 m at Hlávňovice (we. Boh.). Max. occ.: 400-500 m. It is a colline and submountain species. Fig. 32 C.

*Planetella arenariae* (Ruhsaamen, 1899)

Larvae cause galls on the stems of *Carex arenaria* L. (Cyperaceae). Bayer (1917, 1920), Baudys (1917-1948) and Baudys & Vimmer (1919) found galls in 18 loc. Fr. gr. II sp. occ. scarcely. Alt. range: 190 m at Rajhrad (so. Mor.) - 403 m at Plavý (no. Boh.). It is a planare and colline species. Since 1948 it has not been found, it is a disappeared and extinct species. Fig. 27 D.

*Planetella billoti* (Kieffer, 1909)

Larvae cause galls on the stems of *Carex davalliana* Sm. (Cyperaceae). Bayer (1917), Baudys (1917) and Baudys & Vimmer (1919-1920) found galls in 10 loc. Fr. gr. I sp. occ. solitary. Alt. range: 173 m at Lednice (so. Mor.) - 321 m at Železnice (ea. Boh.). It is a planare and colline species. Since 1920 it has not been found, therefore it is ranked as a disappeared and extinct species. Fig. 28 E.

*Planetella caricis* (Ruhsaamen, 1911)

Syn. *Pseudhornumia baudys* Vimmer, 1925

Larvae cause galls on the stems of *Carex elata* All. and *C. stricta* Good. (Cyperaceae). Baudys & Vimmer (1919) and Vimmer (1925, 1937) found galls in 3, Skuhrava (1959) in one loc. Fr. gr. I sp. occ. solitary. Alt. range: 200

m at Praha-Chuchle (m. Boh.) - 364 m at Hradec nad Moravicí (no. Mor.) It is a colline species.

***Planetella cornifex* (Kieffer, 1898)**

Larvae cause corn-like galls on *Carex pallescens* L. and *C. elata* All. (Cyperaceae). Baudyš (1916, 1964), Bayer (1917), Baudyš & Vimmer (1919) and Vimmer (1925) found galls in 25 loc. Fr. gr. II sp. occ. scarcely. Alt. range: 198 m at Rozdávovice (m. Boh.) - 1030 m at Čertovo jezero in the Šumava Mts. Max. occ.: 200-300 m. It is a colline species and penetrates into the submountain and mountain zones. Since 1920 it has not been found, it is ranked as a disappeared and extinct species. Fig. 28 B.

***Planetella fischeri* (Frauenfeld, 1867)**

Larvae produce swellings on *Carex pilosa* Scop. (Cyperaceae). Bayer (1917), Baudyš & Vimmer (1919) and Baudyš (1925, 1964) found galls in 10 loc. Fr. gr. I sp. occ. solitary. Alt. range: 222 m at Brno-Křilovo Pole - 545 m at Frstř (both in so. Mor.). Max. occ.: 200-300 m. It is a colline species. It is ranked as a disappeared and extinct species.

***Planetella fireni* (Kieffer, 1909)**

Larvae cause swellings of the leaves of *Carex pallescens* L. and *C. elata* All. (Cyperaceae). Bayer (1917, 1920), Baudyš & Vimmer (1919), Vimmer (1925) and Baudyš (1925, 1940, 1964) found galls in 12 loc. Fr. gr. II sp. occ. scarcely. Alt. range: 260 m at Praha (m. Boh.) - 564 m at Sušice (so. Mor.). It is a colline species, it penetrates into the submountain zone and is ranked as a disappeared and extinct species.

***Planetella gallurum* (Ruhssamen, 1899)**

Larvae produce corn-like galls on the stems of various spp. of *Carex* (Cyperaceae). Baudyš (1912, 1916), Bayer (1917) and Vimmer (1937) found galls in 6 loc. Fr. gr. I sp. occ. solitary. Alt. range: 198 m at Rozdávovice (m. Boh.) - 424 m at Lomnice nad Lužnicí (so. Boh.). It is a colline species and is ranked as a disappeared and extinct species.

***Planetella granifex* (Kieffer, 1898)**

Larvae develop in swellings on *Carex echinata* Murray and other spp. (Cyperaceae). Bayer (1917), Baudyš (1916, 1954) and Baudyš & Vimmer (1919) found galls in 20 loc. Fr. gr. II sp. occ. scarcely. Alt. range: 190 m at Rajhrad (so. Mor.) - 1464 m at Vysoká hora in the Hrubý Jeseník Mts. It is a colline species and penetrates up to the sub-Alpine zone. It is ranked as a disappeared and extinct species. Fig. 28 A.

***Planetella kneuckeri* (Kieffer, 1909)**

Larvae produce galls on *Carex elata* All. (Cyperaceae). Bayer (1917), Baudyš & Vimmer (1919) and Baudyš (1940) found galls in 3 loc. Fr. gr. I sp. occ. solitary. Alt. range: 257 m at Ivaňská (ea. Boh.) - 375 m at Šoběšice (so. Mor.). It is a colline species. Since 1932 it has not been found, it is ranked as a disappeared and extinct species.

***Planetella rosenhaueri* (Ruhssamen, 1892)**

Larvae cause galls on *Carex acutiformis* Lhrh. (Cyperaceae). Vimmer (1937) found galls only at one loc. in the Prachovské Skály Rocks, 400 m (ea. Boh.). Fr. gr. I sp. occ. solitary. It is a colline species and it is ranked as a disappeared and extinct species.

***Planetella subterranea* (Kieffer et Trotter, 1904)**

Larvae cause galls on *Carex diuturna* (Gong.) Wahlb. (Cyperaceae). Bayer (1920) found galls only in one loc. at Dolní Běrkovice, 158 m (m. Boh.). Fr. gr. I sp. occ. solitary. It is a planare species and it is ranked as a disappeared and extinct species.

***Planetella tubertica* (Ruhssamen, 1899)**

Larvae cause swellings on the stems of *Carex elata* All. (Cyperaceae). Bayer (1917), Baudyš & Vimmer (1919), Baudyš (1923, 1925) and Vimmer (1937) found galls in 6 loc. Fr. gr. I sp. occ. solitary. Alt. range: 183 m at Lysá nad Labem (m. Boh.) - 1030 m at the lake Černé Jezero in the Šumava Mts. It is a colline species and penetrates into the mountain zones. It is ranked as a disappeared and extinct species.

***Planetella tumorigica* (Ruhssamen, 1899)**

Larvae produce swellings of *Carex pseudocyperus* L. (Cyperaceae). Bayer (1917) found galls in two loc. Fr. gr. I sp. occ. solitary. Alt. range: 170 m at Strachotín (so. Mor.) - 221 m at Pánčovice (ea. Boh.). It is a planare species and is ranked as a disappeared and extinct species.

***Planetella abietina* Sertner, 1908**

Larvae develop in seeds of *Picea excelsa* (L.) Karstén (Pinaceae). Baudyš (1948, 1963) and Čermák (1952) found damaged seeds in 7, Skuhřava (1964) in one loc. Fr. gr. I sp. occ. solitary. Alt. range: 332 m at Kácov (m. Boh.).



- 524 m at Veselí (so Mor) It is a colline species

*Ptemeliella betulicola* (Kieffer, 1889)

Larvae induce galls in the terminal leaf buds of *Betula pubescens* Ehrh. and *B. pendula* Roth (Betulaceae) Baudyš (1916, 1924, 1926), Vunmer (1925, 1931) and Seidel (1957) found galls in 7, Skuhřavá (1964-1982) in 177 loc. At present fr. gr. V sp. occ. abundantly, with increasing population density. Alt. range 188 m at Předníčice nad Jizerou (m Boh) - 1070 m at Pláně in the Šumava Mts. Max. occ. 400-700 m. It is a colline and submountain species and penetrates into the mountain zone. Fig. 38 A

*Polystepha malpighii* (Kieffer, 1909)

Larvae cause parenchymous galls on the leaves of *Quercus robur* L. and *Q. petraea* (Matt.) Liehl (Fagaceae) Baudyš (1916-1954) found galls in 14, Skuhřavá (1973) in 5 loc. Fr. gr. I sp. occ. solitarily. Alt. range 236 m at Kordějov (so Mor) - 618 m at Váň (we Boh) Max. occ. 300-400 m. It is a colline species

*Polystepha quercus* Kieffer, 1897

Larvae develop in small galls on the leaves of *Quercus robur* L. (Fagaceae) Skuhřavá (1979) found galls in one loc. at Kadov, 510 m (so Boh) Fr. gr. I sp. occ. solitarily. It is a colline species

*Putoniella pruni* (Kaltenbach, 1872)

Syn. *P. mansupialis* (F. Low, 1889)

Larvae produce swellings on the leaves of *Prunus spinosa* L. and other spp. (Rosaceae) Bayer (1910-1946), Baudyš (1912, 1966) and Vunmer (1925-1937) found galls in 60, Skuhřavá (1959-1982) in 67 loc. Fr. gr. III sp. occ. moderately, with stable population density. Alt. range 182 m at Ostrožská Nová Ves (so Mor) - 784 m at Slavkovský Chlumek (so Boh) Max. occ. 200-400 m. It is a colline species and penetrates into the submountain zone. Fig. 20 C

*Resseliella ditzigomyzae* (Barnes, 1933)

Larvae live in larval mines of *Phytobia cambii* (Hendel) (Agromyzidae, Diptera) in the cambium zone of *Salix viminalis* L. (Salicaceae) Urban and Skuhřavá (1982) found them in two loc. Fr. gr. I sp. occ. solitarily. Alt. range 175 m at Pouzdřany - 220 m at Chvalkovice (both in so Mor) It is a planare species

*Resseliella oculiperda* (Rubsamen, 1893)

Larvae live between bud grafts and the stock of cultivated *Rosa*-species and fruit trees (Rosaceae) Vunmer (1931) reported substantial damage to pear trees at Velesín, 548 m (so Boh), Skuhřavá (1980) mentioned damage to rose shrubs at Nový Bydžov, 232 m (ea Boh) Next loc. Praha, 260 m, Kozojedy, 368 m (m Boh), Bechyně, 406 m (so Boh) (all leg. prof. Melichar; unpublished data) Fr. gr. I sp. occ. solitarily. It is a colline species

*Resseliella piceae* Seitner, 1906

Larvae develop inside young fruits in the cones of *Abies alba* L. (Pinaceae) Pfeffer (1937) and Černák (1943, 1952) found larvae in seeds in 4 loc. Fr. gr. I sp. occ. solitarily. Alt. range 258 m at Adamov (so Mor) - 694 m at Vunperk (so Boh) Fr. gr. I sp. occ. solitarily. It is a colline and submountain species

*Resseliella skuhřavayorum* Skrzypczyńska, 1975

Larvae develop in the cones of *Larix decidua* Mill. and *L. polonica* Rac. (Pinaceae) Křístek et al. (1976) found larvae in 14 loc. Fr. gr. I sp. occ. scarcely. Alt. range 234 m at Buchlovice - 540 m at Habruvka (both in so Mor) It is a colline species and penetrates into the submountain zone. Fig. 15 C

*Resseliella theobaldi* (Barnes, 1927)

Larvae develop under the rind of *Rubus idaeus* L. (Rosaceae) Vunmer (1931) found larvae in one loc. at Počátky, 568 m (so Mor) Fr. gr. I sp. occ. solitarily. It is a submountain species

*Rhizomyia ornata* Mamaev, 1967

Larvae develop on the surface of rotten wood. Dr. V. Zeman found larvae in 1965 at the loc. Hradec Králové, 235 m (ea Boh) (unpublished data) Fr. gr. I sp. occ. solitarily. It is a colline species

*Rhopalomyia artemisiae* (Bouché, 1834)

Larvae cause large galls on *Artemisia campestris* L. and *A. scoparia* WK. (Asteraceae) Bayer (1910, 1912, 1914), Baudyš (1916-1926), Vunmer (1928) and Černík (1925) found galls in 30, Skuhřavá (1975-1982) in 18 loc. At present fr. gr. II sp. occ. scarcely, with decreasing population density. Alt. range 185 m at Louňy - 485 m at Hazmburk (no Boh) Max. occ. 200-300 m. It is a planare and colline species. Fig. 13 B

*Rhopalomyia baccarum* (Wachtl, 1883)

Larvae produce galls on the stems of *Artemisia vulgaris* L. and *A. scoparia* WK. (Asteraceae) Baudyš (1916-



1964) found galls in 6, Skuhrava (1981) in one loc. Fr. gr. I sp. occ. solitary. Alt. range 200 m at Pouzdřany - 445 m at Kámen (both in so. Mor.). It is a planare and colline species which is ranked as a disappearing and endangered species. Fig. 8 C.

*Rhopalomyia baudysi* Vimmer, 1928

Larvae cause galls on the leaflets of *Artemisia pontica* L. (Asteraceae). Vimmer (1928) described this sp. based on material found by Baudyš at Hustopeče, 215 m (so. Mor.). Since 1928 this sp. has not been found. Fr. gr. I sp. occ. solitary. It is a planare species.

*Rhopalomyia crisiaegalli* (Karsch, 1877)

Larvae cause galls on flowers of *Rhnanthus minor* L. (Scrophulariaceae). Vimmer (1928) found galls in one loc. at Kožov, 185 m (no. Boh.). Fr. gr. I sp. occ. solitary. It is a planare species.

*Rhopalomyia flavipes* Vimmer, 1928

Larvae develop in flower heads of *Artemisia vulgaris* L. (Asteraceae). Vimmer (1928) described adults based on material collected by Baudyš at the loc. Lipník nad Bečvou, 233 m (so. Mor.). Fr. gr. I sp. occ. solitary. It is a colline species.

*Rhopalomyia florum* (Kieffer, 1890)

Larvae live in small galls in the flower heads of *Artemisia vulgaris* L. (Asteraceae). Baudyš (1912, 1926) found galls in 3, Skuhrava (1975, 1979) in 2 loc. Fr. gr. I sp. occ. solitary. Alt. range 171 m at Lábeč - 470 m at Nové Strašecí (both in m. Boh.). It is a colline species.

*Rhopalomyia foliorum* (H. Loew, 1850)

Larvae produce small galls on the leaves of *Artemisia vulgaris* L. (Asteraceae). Vimmer (1928) and Baudyš (1954-1964) found galls in 17, Skuhrava (1964-1982) in 88 loc. At present fr. gr. IV sp. occ. considerably, with increasing population density. Alt. range 173 m at Lednice (so. Mor.) - 665 m at Andělská Hora (we. Boh.). Max. occ. 100-300 m. It is a colline species and penetrates into the submountain zone. Fig. 25 D.

*Rhopalomyia hypogaea* (F. Low, 1885)

Larvae cause galls on the stems of *Chrysanthemum leucanthemum* L. (Asteraceae). Baudyš (1954) found galls only at one loc. at Karlov pod Prácheňem, 709 m (no. Mor.). Fr. gr. I sp. occ. solitary. It is a submountain species.

*Rhopalomyia millefolii* (H. Loew, 1850)

Larvae produce galls on flowers, leaves and axillary buds of *Achillea millefolium* L. (Asteraceae). Bayer (1910, 1914), Baudyš (1916-1964), Vimmer (1928) and Čemík (1935) found galls in 60, Skuhrava (1964-1982) in 22 loc. Fr. gr. II sp. occ. scarcely, with decreasing population density. Alt. range 175 m at Stará Boleslav (m. Boh.) - 1065 m at Javorník in the Šumava Mts. Max. occ. 200-300 and 500-600 m. It is a colline and submountain species and penetrates into the mountain zone. It is ranked as a vulnerable species. Fig. 45 C.

*Rhopalomyia pseudofoliorum* Vimmer, 1924

Larvae develop in small leaf galls on *Artemisia campestris* L. (Asteraceae). Vimmer (1924) described this sp. based on material collected by Baudyš at Svatý Kopeček near Mikulov, 240 m (so. Mor.). Fr. gr. I sp. occ. solitary. It is a planare species.

*Rhopalomyia ptarmicae* (Vallot, 1849)

Larvae cause galls on *Achillea ptarmica* L. (Asteraceae). Bayer (1912) and Baudyš (1954) found galls in 3, Skuhrava (1972-1982) in 14 loc. Fr. gr. II sp. occ. solitary, with increasing population density. Alt. range 247 m at Horní Hermanice (no. Mor.) - 820 m at Kovářská (no. Boh.). It is a colline and submountain species and penetrates into the mountain zone. Fig. 43 E.

*Rhopalomyia simulans* Vimmer, 1924

Larvae produce galls at the growing points of *Artemisia campestris* L. (Asteraceae). Vimmer (1924) described this species based on material collected by Baudyš at the loc. Suchá hora in Bma, 400 m (so. Mor.). Baudyš (1926) found galls in 10 loc. Fr. gr. I sp. occ. solitary. Alt. range 183 m at Mutěnice - 550 m at Děvín in the Pavlovské kopce Hills (so. Mor.). It is a planare and colline species. Since 1926 it has not been found, it is ranked as a disappeared and extinct species. Fig. 13 D.

*Rhopalomyia syngenetae* (H. Loew, 1850)

Larvae form galls in the flower heads of *Tripleurospermum inodorum* (L.) C. H. Schultz and *Anthemis urvensis* L. (Asteraceae). Baudyš (1917) found galls in 3, Skuhrava (1981) in 2 loc. Fr. gr. I sp. occ. solitary. Alt. range 182 m at Ostrožka-Nová Ves - 350 m at Kočič skály near Mikulov (both in so. Mor.). It is a planare and colline

species

*Rhopalomyia tanaceticola* (Karsch, 1879)

Larvae cause large galls in flower heads, in the axils and on the leaves of *Tanacetum vulgare* L. (Asteraceae). Kuehner (1855), Bayer (1914) and Baudyš (1912, 1968) found galls in 36, Skuhra (1964-1982) in 21 loc. At present fr. gr. II sp. occ. scarcely, with decreasing population density. Alt. range: 158 m at Břeclav (so. Mor.) - 709 m at Karlov pod Prádelm. (no. Mor.). Max. occ.: 300-400 m. It is a planare and colline species and penetrates into the submountain zone. Fig. 27 L.

*Rhopalomyia tubifex* (Bouché, 1847)

Larvae produce tubular galls at the growing points of *Artemisia campestris* L. (Asteraceae). Baudyš (1912, 1925, 1939), Bayer (1914) and Vimmer (1928) found galls in 10, Skuhra (1981) in 1 loc. Fr. gr. I sp. occ. solitarily. Alt. range: 182 m at Místek (so. Mor.) - 301 m at Bělá pod Bezdězem (m. Boh.). It is a planare and colline species and is ranked as a disappearing and endangered species. Fig. 7 C.

*Rondaniola bursaria* (Bremi, 1847)

Larvae cause cylindrical galls on the leaves of *Glechoma hederacea* L. (Lamiaceae). Bayer (1910, 1912, 1914), Baudyš (1916, 1968) and Seidel (1957) found galls in 50, Skuhra (1957-1982) in 130 loc. At present fr. gr. IV sp. occ. considerably, with increasing population density. Alt. range: 167 m at Hodonín - 726 m at Klepáčov (no. Mor.). Max. occ.: 200-300 m. It is a colline and submountain species and occurs also in the planare zone. Fig. 22 A.

*Sackenomyia reaumuri* (Bremi, 1847)

Syn. *Phyllobolia solmsi* (Kieffer, 1906)

Larvae produce pustule galls on the leaves of *Viburnum lantana* L. (Caprifoliaceae). Bayer (1910, 1914) and Baudyš (1925, 1926) found galls in 7, Skuhra (1981) in one loc. Fr. gr. I sp. occ. solitarily. Alt. range: 192 m at Valtice - 550 m at Děvín in the Pavlovské vrchy Hills (both in so. Mor.). It is a colline species and is ranked as a disappearing and endangered species. Fig. 16 C.

*Schizomyia galorum* Kieffer, 1889

Larvae gall the flower buds of *Galium mollugo* L. and other spp. (Rubiacaceae). Vimmer (1907, 1937), Bayer (1910) and Baudyš (1916, 1968) found galls in 93, Skuhra (1957-1982) in 351 loc. It is one of the most common species of gall midges of the Czech Republic, with increasing population density (fr. gr. VI). Alt. range: 136 m at I doměhu (no. Boh.) - 1070 m at Pláně in the Šumava Mts. Max. occ.: 300-400 m. It is a colline and submountain species, occurs in the planare zone and penetrates into the mountain zone. Fig. 46 B.

*Schmidtiella gemmarum* Ruhsaamen, 1914

Larvae cause small galls on *Juniperus communis* L. (Cupressaceae). Baudyš (1926, 1954, 1963) found galls in 4, Skuhra & Skuhrový (1960) and Skuhra (1974, 1979, 1980) in 5 loc. Fr. gr. I sp. occ. solitarily. Alt. range: 230 m at Jabkenice (m. Boh.) - 620 m at Babín (so. Mor.). It is a colline species and penetrates into the submountain zone.

*Semudobia betulae* (Winnertz, 1853)

Larvae induce galls on the fruits in catkins of *Betula pubescens* Ehrh. and *B. pendula* Roth. (Betulaceae). Baudyš (1916, 1940, 1954) and Vimmer (1931) found galls in 10, Skuhra (1957-1982) in 118 loc. At present fr. gr. IV sp. occ. considerably, with increasing population density. Alt. range: 162 m at Neratovice (m. Boh.) - 1065 m at Javorník in the Šumava Mts. Max. occ.: 400-500 m. It is a colline and submountain species and penetrates into the mountain zone. Fig. 38 B.

*Semudobia skuhrae* Roskam, 1977

Larvae cause small ovoid galls situated between spindle and the scales in catkins of *Betula pendula* Roth. (Betulaceae). Skuhra (1972, 1979) found galls in 6 loc. Fr. gr. I sp. occ. solitarily. Alt. range: 247 m at Vinohr. (m. Boh.) - 1065 m at Javorník in the Šumava Mts. It is a colline species and penetrates into the mountain zone.

*Semudobia tarda* Roskam, 1977

Larvae develop in swollen fruits in catkins of *Betula pubescens* Ehrh. and *B. pendula* Roth. (Betulaceae). J. C. Roskam determined adults bred from galls of 3 loc.: Brantice, 241 m (no. Mor.), Vinohr., 247 m (m. Boh.) and Lnářský Malšov., 504 m (so. Boh.) (unpublished data). Fr. gr. I sp. occ. solitarily. It is a colline species.

*Sitodiplosis mosellana* (Géhin, 1857)

Larvae feed solitarily on the developing grains in the ears of *Triticum vulgare* L. (Poaceae). Baudyš (1921) reported larvae to occur in the area Pýšetinský, Skuhra (1979, 1980, 1981) the presence of larvae in samples of

wheat ears collected at 20 loc. Fr. gr. II sp. occ. scarcely with increasing population density. Alt. range 177 m at Stražnice - 559 m at Horní Lhce (both in so. Mor.). Max. occ. 200-300 m. It is a planare and colline species. Fig. 13 B.

*Spurgia capitigena* (Brenn., 1847)

Syn. *Dasineura subpania* (Brenn., 1847) (Gagne 1990: 337)

Larvae cause galls on the tips of the vegetative shoots of *Euphorbia cyparissias* L. (Euphorbiaceae). Bayer (1910, 1946), Baudyš (1914, 1964) and Čermák (1925, 1931) found galls in 90. Skuhřava (1957-1982) in 166 loc. At present fr. gr. V sp. occ. abundantly, with increasing population density. Alt. range 136 m at Litoměřice (no. Boh.) - 680 m at Kaniž (no. Mor.). Max. occ. 100-200 m. It is a planare and colline species and penetrates into the submountain zone. Fig. 25 B.

*Spurgia esulae* Gagné, 1990

Larvae cause galls on the tips of the vegetative shoots of *Euphorbia esula* L. (Euphorbiaceae). Bayer (1912) and Baudyš (1916, 1947, 1954) found galls in 6 loc. Fr. gr. I sp. occ. solitary. Alt. range 192 m at Zahradovice (m. Boh.) - 293 m at Námě (no. Mor.). It is a colline species.

*Stefaniella atriplicis* Kieffer, 1898

Baudyš (1924) found galls on *Atriplex rosea* L. (Chenopodiaceae) at one loc. at Brno, 207 m, and determined them as *S. atriplicis*. Fr. gr. I sp. occ. solitary. It is a colline species.

*Stefaniella brevipalpis* Kieffer, 1898

Baudyš (1924) found galls on *Atriplex rosea* L. (Chenopodiaceae) at one loc. at Brno, 207 m, and determined them as *S. brevipalpis*. Fr. gr. I sp. occ. solitary. It is a colline species.

*Stefaniella cecconi* Kieffer, 1909

Larvae cause small swellings on the stem of *Atriplex patula* L. (Chenopodiaceae). Baudyš (1916, 1924) found galls in 2 loc. Fr. gr. I sp. occ. solitary. Alt. range 200 m at Komarov (so. Mor.) - 260 m at Praha (m. Boh.). It is a colline species.

*Taxomyia taxi* (Inchbald, 1861)

Larvae cause artichoke-shaped galls on the shoots of *Taxus baccata* L. (Taxaceae). Baudyš (1946, 1963) found galls in 4. Skuhřava (1973, 1975, 1979) in 14 loc. Fr. gr. II sp. occ. scarcely. Alt. range 250 m at Strbomý Luh near Krivoklát - 490 m at Drbákov (both in m. Boh.). It occurs on trees and shrubs growing only in indigenous loc. (Skuhřava 1964, 1965). It is a colline species. Fig. 15 D.

*Thecodiplosis brachyniera* (Schwagnichen, 1835)

Larvae cause galls at the base of the pair of needles of *Pinus sylvestris* L. and *P. mugo* Turra (Pinaceae). Kowarz (1894), Vanner (1913), Bayer (1920), Komarek (1924), Gradojevič (1924), Baudyš (1918, 1963) and Přihoda (1949) found galls in 30. Skuhřava (1964-1982) in 67 loc. Fr. gr. III sp. occ. moderately, with long-term fluctuations in population density and with outbreaks occurring at 10-11 years intervals (Skuhřavý 1991). Alt. range 175 m at Stará Boleslav (m. Boh.) - 1400 m at the Pančická louka in the Krkonoše Mts. Max. occ. 400-600 m. It is a colline, submountain and mountain species and penetrates into the sub-Alpine zone.

*Therodiplosis persicae* Kieffer, 1912

Larvae are predators of mites of *Tetranychus urticae* Koch (Tetranychidae, Acarina) on various host plant species. Havelka & Skuhřava (1984) and Skuhřava (1991) found this sp. in two loc. Fr. gr. I sp. occ. solitary. Alt. range 173 m at Lednice (so. Mor.) - 398 m at Vodňany (so. Boh.). It is a colline species.

*Thurana aquatica* Ruhsaamen, 1899

Larvae develop between the stem and leaf sheaths of *Carex appropinquata* Schum. (Cyperaceae). Baudyš (1918), Baudyš & Vanner (1919) and Vanner (1925, 1937) found larvae in 5 loc. Fr. gr. I sp. occ. solitary. Alt. range 232 m at Dvorce - 355 m at Doubravice (both in ea. Boh.). It is a colline species.

*Tricholoba trifoli* Ruhsaamen, 1917

Larvae cause galls (folded leaves) of *Trifolium pratense* L. (Fabaceae). Baudyš (1968) found galls in one loc., Skuhřavá (1971-1982) in 84 loc. Fr. gr. IV sp. occ. considerably. Alt. range 156 m at Litoměřice (no. Boh.) - 800 m at Hojna Voda (so. Boh.). Max. occ. 200-300 m. It is a colline and submountain species. Fig. 27 C.

*Trisopsis acicularis* Mamaev, 1961

Biology unknown. One male was determined in the material from Kunčsky, 620 m (so. Mor.) in the framework of ecosystem studies (Vanhara 1983). Fr. gr. I sp. occ. solitary. It is a colline species.

*Troteria galii* Ruhsaamen, 1912

Larvae are inquiline in the galls of *Schizomyia galiorum* Kieffer. Skuhra (1959-1982) found larvae in 11 loc. Fr. gr. II sp. occ. scarcely. Alt. range: 215 m at Senti - 650 m at Destne (both in ea. Boh.). It is a colline and submountain species.

*Troteria ligustri* Barnes, 1954

Larvae are inquiline in the galls of *Placochela ligustri* (Rübhausen). Skuhra (1981) found larvae at one loc. at Zdonky, 237 m (so. Mor.). Fr. gr. I sp. occ. solitary. It is a colline species.

*Troteria obtusa* (H. Loew, 1845)

Syn. *T. sarothami* (Kieffer, 1890)

Larvae are inquiline in the galls of *Asphondylia sarothami* H. Loew and of other *Asphondylia* spp. developing on Fabaceae. Skuhra (1964-1982) found larvae in 8 loc. Fr. gr. I sp. occ. solitary. Alt. range: 207 m at Libčice nad Vltavou (m. Boh.) - 620 m at Landštejn (so. Boh.). It is a colline species and penetrates into the submountain zone.

*Troteria umbelliferarum* Kieffer, 1901

Larvae are inquiline in the galls of *Kiefferia pericarpicola* (Brenn). Skuhra (1980) found this sp. in one loc. at Brno, 428 m (so. Mor.), and reared adults from galls collected at Hlucin, 241 m (no. Mor.), and at Zdechovice, 228 m (ea. Boh.) (unpublished data). Fr. gr. I sp. occ. solitary. It is a colline species.

*Wachtliella dalmatica* Ruhsaamen, 1915

Larvae cause galls (folded leaflets) on *Medicago falcata* L. and *M. prostrata* Jacq. (Fabaceae). Skuhra (1981) found galls in one loc. at Květnice, 304 m (so. Mor.). Fr. gr. I sp. occ. solitary. It is a colline species.

*Wachtliella ericina* (F. Low, 1885)

Larvae produce small rosette galls on the growing points of *Erica herbacea* L. (Ericaceae). Baudyš (1917) and Skuhra (1972) found galls in one and the same loc. at the Nature Reserve Čertova stěna near Vyšší Brod in the Sumava Mts., 697 m (so. Boh.). Fr. gr. I sp. occ. solitary. It is a submountain species.

*Wachtliella mehlerti* Ruhsaamen, 1915

Larvae cause pot-like galls on the leaflets of *Cytisus nigricans* L. (Fabaceae). Baudyš (1920-1965), Vimmer (1935) and Čermík (1940) found galls in 18, Skuhra (1964-1982) in 25 loc. Fr. gr. II sp. occ. scarcely, with stable population density. Alt. range: 241 m at Brantice (no. Mor.) - 760 m at Slupečná (so. Boh.). It is a colline and submountain species. Fig. 31 D.

*Wachtliella persicariae* (Linné, 1767)

Larvae produce galls (rolled leaf margins) on *Polygonum amphibium* L. (Polygonaceae). Bayer (1910, 1912, 1914), Baudyš (1916-1967) and Vimmer (1925, 1935) found galls in 100, Skuhra (1957-1982) in 121 loc. Fr. gr. IV sp. occ. considerably, with stable population density. Alt. range: 162 m at Neratovice (m. Boh.) - 670 m at Kamenický (ea. Boh.). Max. occ. 400-500 m. It is a planare and colline species and penetrates into the submountain zone. Fig. 24 L.

*Wachtliella riparia* (Winnertz, 1853)

Larvae develop in swollen fruits of *Carex riparia* L. and other spp. (Cyperaceae). Bayer (1912-1946), Baudyš (1916-1964), Baudyš & Vimmer (1919) and Vimmer (1925, 1936) found galls in 30, Skuhra (1964-1979) in 8 loc. Fr. gr. I sp. occ. solitary, with decreasing population density. Alt. range: 190 m at Rajhrad (so. Mor.) - 577 m at Roudno (no. Mor.). Max. occ. 200-300 m. It is a colline species and penetrates into the submountain zone. Fig. 28 C.

*Wachtliella rosarum* (Hardy, 1850)

Larvae produce galls (folded leaflets) on *Rosa canina* L. and other spp. (Rosaceae). Hieronymus (1890), Bayer (1912, 1916, 1946), Baudyš (1912-1968) and Vimmer (1925) found larvae in 190, Skuhra (1957-1982) in 317 loc. Fr. gr. V sp. occ. abundantly, with increasing population density. Alt. range: 136 m at Litoměřice (no. Boh.) - 906 m at Mlýnský vrch near Prácheň (so. Boh.). Max. occ. 300-400 m. It is a colline and submountain species which penetrates into the mountain zone and also occurs in the planare zone. Fig. 37 E.

*Wachtliella stachydus* (Brenn, 1847)

Larvae produce leaf and flower bud galls on *Stachys sylvatica* L. (Lamiaceae). Bayer (1912, 1946), Baudyš (1916-1965) and Čermík (1939) found galls in 32, Skuhra (1964, 1980, 1981) in 12 loc. Fr. gr. II sp. occ. scarcely, with decreasing population density. Alt. range: 183 m at Čejč (so. Mor.) - 842 m at Všecký Ch. in the Vsetínské vrchy Hills (no. Mor.). It is a colline and submountain species and penetrates into the mountain zone. Fig. 42 L.

*Xenodiplosis laeviusculi* (Ruhsaamen, 1910)

Larvae live asinquilines under the galls of *Neumoterus laeviusculus* Schenck (Cynipidae, Hymenoptera) on the leaves of *Quercus robur* L. (Fagaceae). Vimmer (1931, 1935) found larvae in 2, Skuhrava (1979) also in 2 loc. Fr. gr. I sp. occ. solitary. Alt. range: 197 m at Vrane nad Vltavou–360 m at Týnec (both in mi. Boh.). It is a colline species.

*Xylodiplosis nigriarvis* (Zetterstedt, 1850)

Larvae develop inside the xylem vessels of *Quercus robur* L. (Fagaceae). V. Skuhrava caught adults (100 females) 14.3.7.5.1984 at Dobruška, 371 m, and one female at Probovice–306 m, 25.2.1989 (both in mi. Boh.) (unpublished data). Fr. gr. I sp. occ. solitary. It is a colline species.

*Zygobothra carpini* (F. Low, 1874)

Larvae produce swellings on the leaves of *Carpinus betulus* L. (Corylaceae). Vimmer (1905, 1913), Bayer (1910, 1914) and Baudys (1916–1967) found galls in 34. Skuhrava (1959–1982) in 104 loc. At present fr. gr. IV sp. occ. considerably, with increasing population density. Alt. range: 175 m at Slava Boleslav (mi. Boh.)–600 m at Hostyn in the Hostynské kopce Hills (so. Mor.). Max. occ.: 300–400 m. It is a colline species and penetrates into the submontane zone. Fig. 17 C.

#### SUMMARY

The zoogeographical diagnoses of all members of the gall midge fauna, including 498 gall midge species occurring in the territory of the Czech Republic, are given. Each species is characterized from the point of view of the horizontal occurrence by the number of localities in which it was ascertained during the first half of the 20th century by earlier authors and by the number of occurrences during the second half of the 20th century by the present author, by the number of one of six frequency groups with verbal denomination, by character of long-term changes in population density, from the point of view of the vertical occurrence by the altitudinal range given by the most extreme lying localities at which the species has been ascertained, by the altitudinal belt of the maximum occurrence, by the designation to one of five groups of vertical occurrence. Species with decreasing population density, disappearing and disappeared species are assigned to one of three IUCN categories indicating the degree of threat.

#### REFERENCE

- SKUHRAVÁ M. 1994: The zoogeography of gall midges (Diptera: Cecidomyiidae) of the Czech Republic. I. Evaluation of faunistic researches in the 1855–1990 period. *Acta Soc. Zool. Bohem.* 57 (1993): 211–293 (here all references cited in present paper, as well as the figures are given).



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### Examples

- (a) Dryden G.L. 1968. Growth and development of *Suncus murinus* on Guam. *J. Mammal.* 49: 51-62.
- (b) Lonnberg E. & Gustavson C. 1937. Contribution to the life-history of the striped wrasse. *Ark. Zool.* 29(7): 1-16.
- (c) Latun G. de 1967. *Grundriss der Zoogeographie*. Jena: Fischer Verlag, 602 pp.
- (d) Makun D. 1987. The status of bats in Israel. pp. 403-408. In: Hrušák V., Horaček I. & Gaisler J. (eds.) *European bat research*. Praha: Charles Univ. Press, 718 pp.
- (e) Schornikov E. I. 1969. A new family of Ostracoda from the supralittoral zone of Kuril islands. *Zool. Zhurnal* 48: 494-498 (in Russian, Engl. abstr.).
- (f) Lekoš V. 1993. [Macrolepidoptera in middle Polabí lowland]. *Polabská Příroda* 4: 19-20 (in Czech).

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